PB-230 798

INDUSTRIAL INCENTIVES FOR WATER POLLUTION ABATEMENT

Howard N. Mantel, et al

Institute of Public Administration

Prepared for:

Public Health Service

1 February 1965

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Industrial Incentives for WATER POLLUTION ABATEMENT

Prepared by
Howard N. Mantel,
with the assistance of Ruth P. Mack,
and the staff of the
INSTITUTE OF PUBLIC ADMINISTRATION
New York, New York
Lyle C. Fitch, President

FEBRUARY 1965

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A Report for the
U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Division of Water Supply and Pollution Control
Washington, D. C. 20201

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February 1, 1965

Mr. Gordon A. McCallum, Assistant Surgeon General
U. S. Public Health Service
Division of Water Supply and Pollution Control
Department of Health, Education, and Welfare
Washington, D. C.

Dear Mr. McCallum:

I am pleased to submit a report, prepared by the Institute of Public Administration, on measures to encourage and assist private industrial firms in abating water pollution. The study underlying this report was undertaken pursuant to a contract with the Division of Water Supply and Pollution Control of the Department of Health, Education, and Welfare. It is a revision of our draft report of June, 1964.

The purpose of the report, as defined by the agreement, is to provide background information on which to base discussion and informed judgment. The report describes and evaluates various measures for facilitating and expediting industrial pollution abatement, but does not make definite recommendations.

The report was prepared principally by Howard N. Mantel of the Institute staff. Many persons have contributed suggestions and information, including numerous experts in the Division of Water Supply and Pollution Control, and representatives of state and local governments and private industries. The persons who have contributed materially are too numerous to list individually, but our thanks go to them all. Special mention is due Dr. Ruth P. Mack of the Institute staff, Professor C. Lowell Harriss of Columbia University, Leonard B. Dworsky, formerly assistant chief of the Division of Water Supply and Pollution Control, and Dr. Allan Hirsch, Program Officer, Division of Water Supply and Pollution Control. Mrs. Ann-Marie Walsh of the Institute staff furnished valuable editorial assistance.

The Institute of Public Administration is pleased to have had an opportunity to co-operate in attacking this exceedingly complex and important problem. If we can be of further assistance, please feel free to call upon us.

Sincerely,

Lyle C. Fitch

Lyle C. Fitch
President

TABLE OF CONTENTS

Page

Chapter I

INTRODUCTION 1

Background of the Study 1

Scope 4

Chapter II

THE INDUSTRIAL POLLUTION PROBLEM 5

Introduction 5

Water as a Limited Resource 5

- Factors Affecting Supply 6
- Factors Affecting Demand 6

Characteristics of Pollution 9

- Physical Characteristics 9
- Impact on the Community 10

Pollution from Industrial Sources 11

- Acid Mine Drainage 11
- Agriculture 12
- Food Processing 12
- Nuclear Production and Power 13
- Chemical Production 13
- Oil Production and Transportation 14
- Urban Land Development 14
- U. S. Government "Industries" 15
- Recreation 15

Magnitude of the Pollution Control Problem 16

Standards in Pollution Abatement 18

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Page

Chapter III

ROLE OF GOVERNMENT AND INDUSTRY

ROLE OF GOVERNMENT AND INDUSTRY 20

Government and Industry Responsibilities........................ 20

- Local.. 20
- State and Interstate................................... 21
- Federal.. 21
- Industry Responsibilities.............................. 22

Current Programs.. 23

- Research and Development............................... 23
- Federal Comprehensive Survey Programs.................. 25
- Low Flow Stream Augmentation........................... 25
- Training of Industry Personnel; Demonstration Projects...... 25

Chapter IV

ENFORCEMENT 27

Federal Enforcement.. 28
State Enforcement.. 30
Political Issues... 30

Control Through Government Contract Specifications............. 32

Chapter V

ECONOMIC ASPECTS OF POLLUTION 34

Chapter VI

FEDERAL INCENTIVES 36

Part I. Economic Aspects of Federal Incentives................. 36

Incentives Through the Federal Income Tax...................... 36

- Accelerated Depreciation............................... 36
- Investment Tax Credit.................................. 41

Page

Other Incentive Devices.... 41

Grants.... 41
Low Cost Loans.... 42
Costs of Alternative Forms of Assistance and Summary of Benefits.... 42

Part 2. Government Programs Relating to Federal Incentives.... 46

Legislation on Accelerated Depreciation.... 46

Tax Credit Legislation.... 51

Government Loan Programs.... 53

Small Business Loans.... 54
Other Government Loan Programs.... 55
Legislation to Provide Low Cost Loans.... 56
Loan Guarantees.... 62

Grants.... 63

Chapter VII

STATE AND LOCAL INCENTIVES 66

Property Tax Exemptions.... 66

State Experience with Respect to Property Tax Exemption.... 69

Rebate on Oil Severance Tax.... 75

Accelerated Depreciation at the State Level.... 77

State and Local Government Loans.... 79

Chapter VIII

FACILITATING PUBLIC TREATMENT OF INDUSTRIAL WASTES 80

Treating Industrial Wastes at Public Facilities.... 80

Area Redevelopment and the War on Poverty.... 82
The Special Problems of Appalachia.... 83

Page

Mandatory Charges and Comprehensive Pollution Control............ 84

A New Federal Tax?.. 87

Chapter IX

CONCLUSIONS

89

Appendix.. 93

Chapter I

INTRODUCTION

Water, its use, reuse, and misuse, has become a paramount problem area in urban America. Blessed with an abundance of natural resources, the nation's rapid economic growth and concentration of expanding population has propelled water policy issues into the forefront of domestic concern. Sobering analysis of future water demand and limits on future water supply demonstrates the need for an intense effort to insure efficient use and reuse of available supplies of water. The wanton spoilage of fresh water sources is being restricted by policies favoring prevention and treatment of water pollution.

Decision-making for effective water policy has become a complex and increasingly subtle art. Water quality management draws upon the specialized talent of a host of physical and social scientists; no longer is it exclusively the domain of the hydrologist and sanitary engineer. The tools and policies which have evolved to maximize fresh water reuse continually require examination and the development of new weapons of attack.

It is against this backdrop that the current study has been developed.

Background of the Study

Under its contract with the Department of Health, Education, and Welfare, the Institute of Public Administration was asked to prepare a report as follows:

ARTICLE 1. Scope of Work

The Contractor, as an independent organization and not as an agent of the Government, shall perform the following services:

1. Review the nature and magnitude of problems of abating industrial pollution of water;

2. Identify, describe and evaluate reasonable and possible alternative measures for providing financial and other appropriate incentives, including the role of state and local governments, to encourage industrial pollution abatement;

3. Evaluate existing incentive programs in local, state or in the Federal government aimed at encouraging industrial pollution abatement; and

4. Discuss and evaluate alternative measures for more effective control with special attention to possible incentives for co-operation by public agencies and private corporations in an effective control program.

An additional alternative to be considered is the potentiality of control under common and statutory law; the study will survey and evaluate the adequacy of the law on industrial pollution control.

The study will consider the roles in a co-ordinated program of the Department of Health, Education, and Welfare, and other Federal departments and agencies, and state and local agencies.

In 1962 the U. S. Advisory Commission on Intergovernmental Relations adopted a report on Intergovernmental Responsibilities for Water Supply and Sewage Disposal in Metropolitan Areas. Among its recommendations was a proposal that the problems of industrial waste treatment be explored in depth with emphasis on the potentiality of tax and other economic incentives to stimulate pollution control measures by private industry. The Commission's recommendations included the following:

> Use of Federal enforcement and Federal incentives for industrial pollution abatement.
>
> Federal action is needed through use of strong enforcement powers and financial incentives, or both, for industrial pollution abatement. The Commission recommends that the President direct the appropriate Federal departments and agencies to evaluate present enforcement powers and financial incentives in order to determine how their effectiveness may be improved through changes in procedures, policy or statutory revision, and the roles of State and local governments in such a program.[1]

The present study is a direct outgrowth of the White House's approval of this recommendation.

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[1] U. S. Advisory Commission on Intergovernmental Relations. Intergovernmental Responsibilities for Water Supply and Sewage Disposal in Metropolitan Areas (Washington: October 1962), p. 131.

Commenting on the recommendation, an official of the U. S. Public Health Service's Division of Water Supply and Pollution Control posed these questions: "What are the opportunities to use the tax structure to assist industry? Water use taxes for those industries using public waters has been suggested. Would loans be of any value? Or a clear-cut grant subsidy? The Congress could effectively use studies in depth identifying all the various possibilities as a debate to determine public policy. These are research challenges that universities and others can accept."[2]

Further impetus for a study along these lines came from Capitol Hill, particularly from the office of Senator Abraham Ribicoff, in the form of sponsorship of bills for accelerated depreciation for expenses incurred in financing industrial waste treatment facilities, and for low cost Federal loans for the same purpose.

Moreover, in January 1963, the President's Water Pollution Control Advisory Board, which endorsed the principle of rapid tax amortization of industrial waste treatment facilities, recommended study of other incentives directed at industrial waste problems. The board declared that feasible incentives were highly desirable.[3] Even earlier, in 1961, the Senate Select Committee on Natural Water Resources headed by Senator Robert S. Kerr of Oklahoma had urged a research effort into the question of economic incentives. The Kerr Committee's report noted:

> From time to time it has been suggested that taxes be levied on contributors of municipal and industrial wastes to water courses, thus providing an economic incentive to construct works for pollution abatement. It has also been suggested that public agencies should establish water rates under which water users would pay all costs of development, treatment, and distribution of water, as a means of holding down the demand for water. However, there appears to be little real interest in changing present practices, and no incentive for state and local water agencies to improve their practices.[4]

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[2] U. S. Department of Health, Education, and Welfare. Public Health Service (Region IX). The Social and Economic Aspects of Water Resource Quality Control (Proceedings of the Eleventh Pacific Northwest Symposium on Water Pollution Research, 1962), p. 11. Paper by Leonard B. Dworsky.

[3] See Water Pollution Control Advisory Board. Report (letter from Robert C. Ayers, Executive Secretary, to Honorable Anthony J. Celebrezze, Secretary of Health, Education, and Welfare, February 28, 1963), pp. 13-14.

[4] U. S. Congress. Senate. Select Committee on National Water Resources. Report (87th Cong., 1st sess., Report No. 29, 1961), p. 59.

Finally, in testimony before the House Subcommittee on Natural Resources and Power last year, Assistant Surgeon General Gordon E. McCallum, chief of the Division of Water Supply and Pollution Control, observed: "We do not have adequate data to estimate how much industry is investing in water pollution control, but it will appear also to be inadequate. Accurate data on the status of the industrial waste problem represents a paramount need. A new type of approach in meeting the industrial waste problem by both industry and government is indicated."[5]

Generally, tax incentives have received a scattering of attention in both government, industry, and civic circles. Given this interest and the desire to stimulate an orderly discussion of the potentiality of incentives as a weapon in the fight against water pollution, the Department of Health, Education, and Welfare--through Public Health Service's Water Supply and Pollution Control Division--agreed to underwrite the current study. The scope of the study was developed in cooperation with the U. S. Advisory Commission on Intergovernmental Relations.

Scope

An operating assumption of the Division of Water Supply and Pollution Control was that the principal need is timely construction of facilities for the treatment of industrial waste effluents. While inplant process changes could minimize water use and pollution, largely through intensified water reuse, the most urgent need was to treat polluted effluents before they entered the receiving waters. Domestic wastes are a major problem but Federal and State grants to aid municipalities in financing treatment facilities are helping to stimulate a gigantic municipal construction program to meet this problem. The lag in construction of treatment facilities is on the industrial side.

Excluded from the scope of the study were (1) the overall problems of domestic wastes; (2) the detergent problem which, while, industrial in its origin, causes pollution by domestic waste discharge; and (3) the technical aspects of pollution and water quality management.

Finally, the Institute of Public Administration was to limit its study to providing the background and an evaluation of means of assisting industry to undertake more effective pollution abatement. The study discusses but does not purport to analyze in depth such procedures as effluent charges and effluent taxes. The study does not purport to make specific recommendations. It is intended to stimulate discussion of the problem, paving the way for future policy decisions and action.

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[5] Gordon E. McCallum. "Statement on Federal Relationships" (Prepared for the Natural Resources and Power Subcommittee, House Committee on Government Operations, 1963), pp. 4-5.

Chapter II

THE INDUSTRIAL POLLUTION PROBLEM

Introduction

This chapter summarizes the problems of water pollution from industrial sources. The term "industry" is used broadly, and includes any process which produces goods or services, including agricultural products.

Water pollution means the introduction of any substance into a natural or artificial waterway, including lakes, reservoirs, streams, rivers, bays, and the ocean, which changes the character of the receiving water so as to lessen its use or attractiveness as a natural resource.

Industrial water pollution problems have grown commensurate with increased industrial productivity. While the problem exists in both urban and rural areas, increases have concentrated in and near urban agglomerations. The industrial pollution problem thus is a part of the overall problems of metropolitanization. It is within these areas that competition for good quality water has intensified. Where formerly a manufacturing company could discharge its waste effluents into a nearby stream without causing much concern, today such pollution may raise havoc. A virtually unknown and unused stream of 50 years ago in 1965 may be a vital source of domestic drinking water, recreation, commercial, and industrial water.

Water as a Limited Resource

The amount of water which can be used by man is limited. Nature's water supply system, the hydrologic cycle, provides clean and wholesome water without diminution to the overall supply. But only a small amount can be captured for domestic, agricultural, industrial and other uses of the human race--and the vegetable and animal life essential to man. As a report to the President on water resources stated: "If we can think of the hydrologic cycle as nature's plumbing system, it must be admitted that the pipes are erratically arranged and the valves capriciously managed. Man is slowly becoming more skillful at forecasting fluctuations in this system; hopefully, some day, he will be able to improve the arrangements."[6]

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[6] U. S. Federal Council for Science and Technology. Report to the President on Water Resources Research (Committee on Interior and Insular Affairs, United States Senate, 88th Cong., 1st sess., Committee Print, 1963), p. 11. See also U. S. Department of Health, Education, and Welfare. Public Health Service. Water Quality Management (Part III of a Report to the Select Committee on National Water Resources, U. S. Senate, 86th Cong., 2d sess., Committee Print No. 24, 1960), p. 2.

Factors Affecting Supply

The dependable fresh water supply available in the United States is about 315 billion gallons a day. By 1980 this supply can be increased to 515 billion gallons a day through impoundment and other devices. The maximum dependable supply which can be developed through improved engineering and extended public works is approximately 600-650 billion gallons a day.

Over 72 percent of daily rainfall evaporates or transpires; of the remaining 28 percent a large proportion is flood water which runs back to the ocean before it can be used. (Flood control programs may increase the amount of this water which can be captured.) The remainder is the national water supply, but much of this returns to the ocean before it is used. Desalination, storage and piping may increase supply or alleviate shortages, but costs at present tend to be prohibitive except in very limited situations.

Factors Affecting Demand

Population expansion and increased industrial activity are key factors accounting for increased demand. The nation's population has moved from 76 million in 1900 to today's estimated population of 191 million. And by the year 2000, this figure may double. The greatest increase will be urban in character. (See Figure 1.) Each person demands water for consumption and other domestic needs as well as requiring food, goods and services, the production of which involves additional use of water. Industrial productivity in the nation will reflect population increases and the continuing affluence of that population. An index of industrial growth using a base of 100 for the period 1947-1949 projects a growth rate of from 180 in 1960 to approximately 770 by the year 2000.

The problem is to assure the adequacy of water supply at the places of greatest population and industrial concentration--most acutely within metropolitan areas. A report by the U. S. Public Health Service notes: "Much industry is moving into or has been encompassed by the metropolitan complex. A large segment of water-using industry is racing to locate at the dwindling sites along our major water resources, particularly the Great Lakes, the Ohio River and the Lower Mississippi. Still another large segment of water-using industry is moving into the Southwest and other water-short regions, for other advantages than water availability are overriding--for the moment at least."[7]

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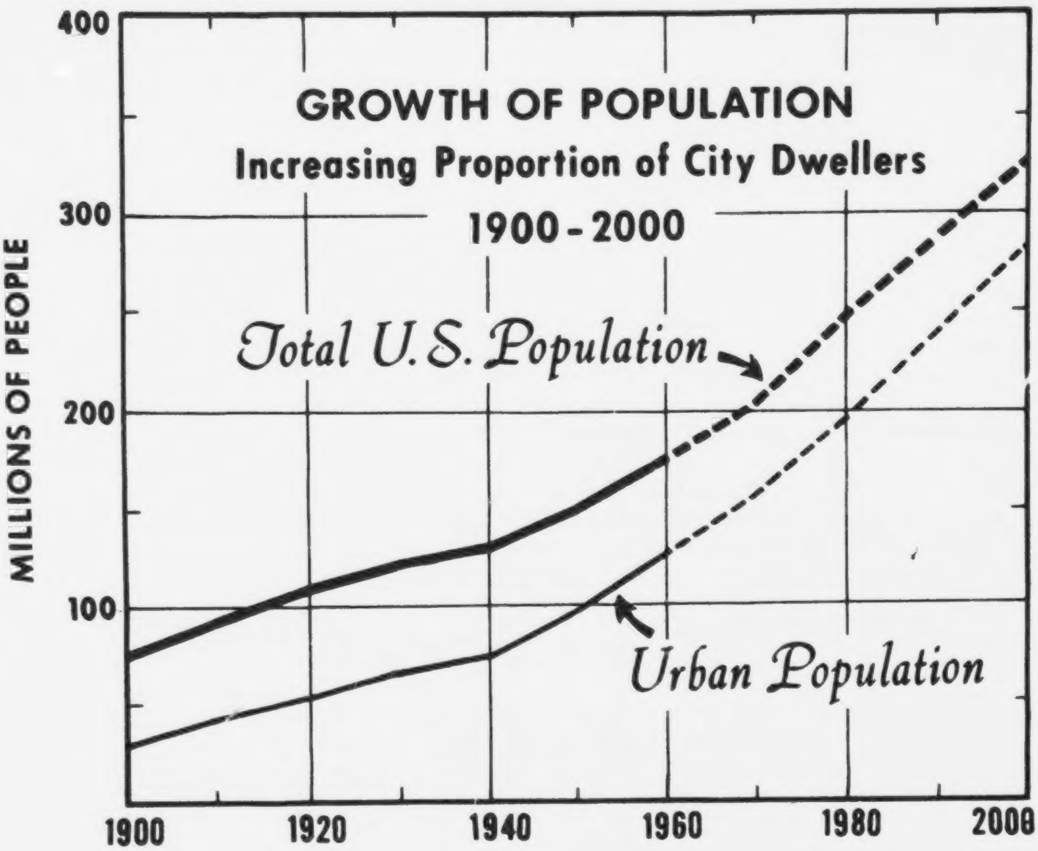
[7] U. S. Department of Health, Education, and Welfare. Public Health Service. Division of Water Supply and Pollution Control. "Statement on the Causes and Extent of the National Water Pollution Problem" (mimeo), p. 10.

Figure 1

UNITED STATES POPULATION GROWTH



Source: National Technical Task Committee on Industrial Wastes. Clean Water-- A Report to the Nation (August 1961), p. 9.

Table 1

FRESH WATER USE FOR MAJOR PURPOSES

1960-1980

(in billions of gallons a day)

Year	Domestic and Municipal	Industrial	Irrigation	Total
1960	22.0	159.9	141.0	322.9
1970	27.0	218.3	165.9	411.2
1980	37.2	394.2	165.7	597.1

Source: Murray Stein. "Problems and Programs in Water Pollution," Natural Resources Journal, vol. 2 (December 1962), p. 395. Stein cites the following sources for original data: "Years 1900-1970 taken from "Water Use in the U. S., 1900-1980," U. S. Department of Commerce, BDSA, March 1960. Projection for 1980 taken from Thesis No. 143, Industrial College of the Armed Forces, April 1957, by D. R. Woodward, U. S. Department of the Interior.

The Public Health Service estimates that by 2000 water use will increase over 1,000 billion gallons a day. Industry will require 80 percent and more of these increases and will account for 65 percent or over for all fresh water use in 1980 and 2000. Between 1960 and 1980 industrial use of water is expected to rise from 159.9 billion gallons a day to 394.2 billion gallons a day. This is attributed to rising output and new technologies which need more water than old ones.

By 1980 the demand for water will exceed fresh supply by 85 billion gallons per day and by 2000 the total demand will exceed the maximum dependable supply of fresh water by more than 350 billion gallons per day. Thus, water reuse is necessary to meet water demand.

In many industries, extensive research and development increasing reuse has led to a sharp reduction in water requirements. In the paper and pulp industry the per capita consumption of paper and paperwood products is 400 pounds annually requiring the withdrawal by 800 pulp and paper mills of nearly 1,600 billion gallons of water annually. Without reuse the amount would have exceeded 4,000 billion gallons per year.

Industry is the biggest water user, but overall it is not a great depletor. In 1960 manufacturing caused a net depletion of fresh water of less than 5 percent of depletions attributable to all withdrawal uses.[8] Thermo-electric power plants withdraw more fresh and saline water than any other category of use except irrigation, but this involves little overall loss or change in character except temperature modification. But about 60 percent of the water withdrawn for irrigation is lost through evaporation and transpiration.

In light of competing demands, water used for waste carrying purposes performs a minimal social and economic function, all factors considered, although it is recognized that the cost of effluent treatment may be very high. In some instances the costs of eliminating the discharge of all water may be astronomical. Most jurisdictions--Federal, state, and local--insist that the waste-carrying function must be extremely limited because of the numerous competing uses for water.

Characteristics of Pollution

Physical Characteristics

Industrial pollution arises from the introduction of industrial waste matter, both organic and inorganic in origin, into a lake, stream, bay, or other water. The pollutant may be introduced as a suspended solid or it may be in a liquid state when it enters the receiving waters.

Biochemical oxygen demand (BOD) is used to measure organic pollution loads. It indicates the rate at which dissolved oxygen is used up by organic wastes in a waste-receiving water. Numerous factors influence

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[8] Allen V. Kneese. "Some Observations on the Economics of Water Quality Management" (Statement on Water Quality Problems, before Subcommittee on Natural Resources and Power, House Committee on Government Operations, June 18, 1963); Appendix, p. 13. Kneese argues that, "a policy that fosters a shift in water use from agricultural to nonagricultural uses when economically justified would permit a manifold growth of the population and economy of the region otherwise precluded by inadequate supply of water. The extent and rate of growth would not be determined by water availability but by other factors that normally influence the location of population and industry. The agricultural sector of the economy might decline in this region, but this would be no cause for concern either to the region as a whole or the nation during the foreseeable future" (p. 37). See also Nathaniel Wollman, et. al. The Value of Water in Alternative Uses (Albuquerque: University of New Mexico Press, 1963) and Select Committee on National Water Resources. Report op. cit., p. 39.

BOD, particularly temperature and chemical characteristics of the receiving water.[9] Although experts differ on standards, it is agreed that to support fish life water must have a dissolved oxygen content averaging at the minimum four milligrams per liter, or about four parts oxygen per million parts of water. This is suggested by a Senate Select Committee (the Kerr Committee) as a reasonably adequate quality of water.[10]

The rate of stream flow affects the natural assimilative quality of water to rid itself of pollution. During periods of low flows, the stream's natural purification capacity is at its lowest; this situation has been rectified in some areas by extensive low flow augmentation programs.

Impact on the Community

Pollution causes a variety of problems. Pollution may affect the color, taste, and smell of the water and surrounding area. It may be offensive esthetically and yet not be a danger to health. Or polluted water may look perfectly harmless and yet be a direct menace to human or animal life.

Pollution imposes limits upon man's ability to use the receiving waters for consumption or other domestic use. While any polluted water can be made suitable for drinking at a price, the price may be so high as to be prohibitive.[11] Pollution limits recreational resources by making many swimming areas unsafe. Others, while "safe" physically, may be so repulsive as to lose all recreational potential. Finally, pollution constrains economic growth. The Public Health Service has pointed out:

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[9] Kneese, (Appendix) op. cit., p. 22. He explains the term further: "The rate of BOD combined with the rate at which oxygen is restored determines the level of dissolved oxygen. In flowing water the combined effect of BOD and re-aeration results in a fall and then a rise in dissolved oxygen as wastes are carried downstream. The stabilization of wastes, together with the restoration of dissolved oxygen in receiving water, is often termed 'self-purification'. For speeding up and controlling the processes which occur naturally in a stream, biological treatment plants can reduce BOD and take some of the burden off the streams, lakes, and estuaries into which wastes are discharged."

[10] Select Committee on National Water Resouces. Report, op. cit., p. 8.

[11] Allan V. Kneese, Water Pollution: Economic Aspects and Research Needs (Washington: Resources for the Future, Inc., 1962), p. 13. See also the discussion starting at p. 5.

> The impairment to health, the loss or dimunition of recreational uses and depreciated property values, all caused by polluted waters, have an adverse economic impact which is diffused throughout society. This is paid for through the reduction in utility of a water resource and the restriction on economic growth rather than through dollar payments for corrective devices. Unfortunately, these latter indirect consequences of pollution are not readily expressed in dollar terms because of their diffusiveness and because they are not recorded overtly in market transactions. Nevertheless, such adverse consequences are real and constitute a handicap to the fulfillment of economic and social goals.[12]

Pollution from Industrial Sources

The discussion which follows is intended to illustrate some of the specific causes of industrial pollution in particular industries.

Acid Mine Drainage

This pollution problem goes back to prehistoric times. When coal beds were formed, sulphur and iron were present in the swampy sediments. During coal mining operations the iron and sulphur bearing material are exposed to the air and usually to water. In water, oxidation transforms these substances into ferrosulphate and sulphuric acid. This overcomes the natural neutralizing capacity of streams. Fish are killed, corrosive damage to equipment results, the waters must be extensively treated for domestic and industrial reuse, and recreational and esthetic values are offended.

Although data is not up-to-date, a report by the Public Health Service suggests a magnitude of 3.5 million tons of acid being discharged into and damaging more than 4,000 miles of streams.

The most extensively used preventative method is to seal the mine. Because the problem is extensive in the eastern coal mining districts,

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[12] "Statement on the Causes and Extent of the National Water Pollution Problem," op. cit., p. 48.

Pennsylvania, more so than any other state, has undertaken sealing research and operations. Between 1947 and 1950, $2.5 million of state funds were expended for sealing operations. Between 1955 and 1962, the U. S. Bureau of Mines spent $3.5 million on Pennsylvania anthracite mines. In 1962 an additional Federal authorization of $5 million was made to continue this work; emphasis was on sealing abandoned mines and preventing persons from entering dangerous locations.

Sealing of 20,000 abandoned mines would reduce by 50 percent the acid load. Keith S. Krause of the Public Health Service suggests that a major control program would have to be federally supported because, "there is no substantial tax base in the areas where most of the abandoned mines are located. The reclamation of streams in these areas could serve as the attractant for new, water-oriented recreation and new industry and be of great benefit in overcoming the economic depression which coincidentally, covers approximately the same portion of the country."13/

Legislation to initiate a new $5 million Federal aid program for mine sealing operations was introduced by Representative John A. Blatnik of Minnesota in the 88th Congress.14/

Agriculture

Irrigation, as has been noted, is a major user and depleter of water, particularly in the West. Extensive use of agricultural pesticides have resulted in major fish kills around the nation. Over 45,000 pesticide formulations are registered with the Department of Agriculture. The pesticide problem, like that of mine drainage, tends to be more amenable to prevention than to treatment.

Food Processing

Wastes from these industries, ranging from canning to poultry processing, are largely organic. A number of good treatment methods exist which can reduce effluent discharges substantially--to the point where

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13/ Keith S. Krause. "Statement for Acid Mine Drainage" (Prepared for Subcommittee on Natural Resources and Power, House Committee on Government Operations, 1963), pp. 6-7. The information derived in this section was from Mr. Krause's statement for the Subcommittee and from: U. S. Department of Health, Education, and Welfare. Public Health Service. Division of Water Supply and Pollution Control. Acid Mine Drainage (Report for the Committee on Public Works, U. S. House of Representatives, 87th Cong., 2d sess., Committee Print No. 18, 1962).

14/ H. R. 6844, 88th Congress.

esthetic senses are not offended and the BOD rate of the receiving waters is within acceptable limits. Nevertheless occasional "horror" stories of rivers running red from the results of chicken processing plants point up the need for more extensive treatment efforts. It is interesting to note that in beet sugar production process changes have been more important than treatment in reducing waste loads.

Nuclear Production and Power

Uranium mining and milling and nuclear power production release pollutants into water. To achieve maximum protection of humans against radiation from polluted nuclear industry wastes requires control at the source.15/

Private industry operates the mines and mills, while the Atomic Energy Commission operates uranium processing plants. The fuel produced is used by the nuclear reactor industry--both private and public--for various purposes including power production. Water contamination and the special danger of radiation exposure may occur at each of these points. Because of extensive regulatory efforts by the Atomic Energy Commission, pollution control appears to be well in hand.16/

Chemical Production

This industry produces a vast and growing array of inorganic substances, and wastes involved in their production have added greatly to the magnitude and complexity of the water pollution problem. Industry's own efforts in providing adequate controls and research are substantial. Reports received by the Manufacturing Chemists Association from 101 major chemical companies with 716 plants (representing more than one-half of the chemical industry's total productivity, with a reported gross water intake of about 10 billion gallons daily) showed a capital expenditure of $233 million for water control facilities, most of which probably has been expended within the last 15 years. Ninety-three percent of the plants are complying with existing state or local pollution control regulations.

15/ "Statement on the Causes and Extent of the National Water Pollution Problem," op. cit., pp. 33-34.

16/ For a good current description of the problems of radioactivity as a cause of water pollution, see Keith S. Krause. "Statement for Radioactivity as Water Pollutant" (Prepared for Subcommittee on Natural Resources and Power, House Committee on Government Operations, 1963).

There are 6,730 processes carried on in the 716 plants; 4,330 or 64 percent discharge into surface water; 1,288 or 19 percent do not have water-borne wastes; 980 (15 percent) discharge into municipal treatment plants; and 2 percent (132 plants) employ deep well disposal methods. Seventy-six percent of the effluent is clean water; 12 percent is treated and meets all requirements; 7.5 percent contains some wastes but requires no treatment because no pollution problem is posed. Of the 4.5 percent effluents which do not meet all requirements currently in force, 1.8 percent are scheduled for improvement.17/

In spite of these findings, the production of chemicals continues to pose substantial pollution problems. This fact manifests the difficulties in ascertaining causes of pollution and devising effective control measures.18/

Oil Production and Transportation

Leakages and spills of oil into waterways constitute the major causes of pollution in the production and transportation of oil. This can result from accident, carelessness, or intentional discharges. In addition, salt water production as an element in oil production is a major cause of pollution in some states.19/ The emphasis in control is on prevention, rather than treatment.

Urban Land Development

The popular process among suburban developers is to use a bulldozer to clear completely a tract of land. As a result, the land is swept bare of all vegetable cover. This causes siltation which may affect the water of nearby streams and lakes.

17/ U. S. Congress. Senate. Committee on Public Works. Water Pollution Control (Hearings before Special Subcommittee on Air and Water Pollution, 88th Cong., 1st sess., 1963), pp. 369-370, hereinafter cited as 1963 Senate Hearings. Information is given in testimony by Jack T. Garrett speaking as chairman of the Water Resources Committee, Manufacturing Chemists Association.

18/ See, e.g., New York Times, April 26, 28 and May 5, 1964.

19/ See Keith S. Krause, "Statement for Oil Production" (Prepared for the Subcommittee on Natural Resources and Power, House Committee on Government Operations, 1963).

U. S. Government "Industries"

About 3 percent of the pollution in this country is caused by installations of the Federal government. Although the wastes from these installations are largely domestic in nature, some Federal facilities, such as prisons and printing plants are engaged in manufacturing activities which produce industrial wastes.

Section 9 of the Water Pollution Control Act declares the intent of Congress that Federal agencies co-operate with the Department of Health, Education, and Welfare in controlling pollution from Federal installations. Moreover, the Secretary of HEW in summaries of any conference under Section 8(c)(3) of the Act (relating to the formal enforcement procedures of that department):

> . . . shall include references to any discharges allegedly contributing to pollution from any Federal property. Notice of any hearing pursuant to Section 8(e) involving any pollution alleged to be effected by any such discharges shall also be given to the Federal agency having jurisdiction over the property involved and the findings and recommendations of the Hearing Board conducting such hearing shall also include references to any such discharges which are contributing to the pollution found by such Hearing Board.

The Administration has established internal procedures for handling these situations. This effort is largely based on a directive by President Kennedy which assigned to the program directors of the Division of Water Supply and Pollution Control in the Public Health Service ". . . responsibility for development of priorities for local action, conduct of surveys and investigations and the furnishing of technical advice and counsel in the solution of abatement problems."[20]

Recreation

Recreational activity may cause pollution from boats lacking waste disposal systems, littering, oil leaks and the discharge of combustion products from small pleasure craft. The problem often can be traced to equipment, thus involving the "recreation" industry. The situation is akin to the detergent problem where the actual discharges are largely domestic, but the production of the detergents in the first place touches off the problem.

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[20] 1963 Senate Hearings, op. cit., p. 506, testimony of William A Schmidt, Deputy Commissioner, Public Buildings Service, General Services Administration.

Magnitude of the Pollution Control Problem

A host of important fiscal and economic issues could be resolved more easily by knowing the magnitude of the dollar expenditures for abatement of industrial pollution sufficient to meet pollutional control standards. Such knowledge would help also in evaluating industry's fiscal capability to handle pollution problems.

Adequate statistics on the magnitude of the pollution problem are lacking. For some industries current data on expenditures to date and future costs required for adequate control have been collected, as in the case of chemical production, noted above. In addition, limited inventory work on expenditures and future costs on a national scale provides some clues as to overall magnitude, but this information is incomplete.21/ Finally, the Public Health Service's Division of Water Supply and Pollution Control is filling the inventory gap, but the information is not presently available in complete form.

In spite of these deficiencies, some notion of magnitudes can be developed to guide decisions.

A Public Health Service report to the Kerr Committee in 1960 pointed out that there were over 280,000 manufacturing establishments in the country. More than 150,000 used sizeable amounts of water. All but about 25,000 manufacturing establishments discharged their liquid wastes to municipal systems. But PHS expressed the opinion that the 25,000 remaining plants who discharge directly to water courses account for the bulk of pollution.22/

Organic industrial wastes have increased tremendously over the years. In terms of population equivalents, they have risen from an estimated 15 million persons in 1900 to 49 million in 1920, and to about 150 million at the present time; by 1980 the figure may be 300

21/ See, e.g., the 1957 Inventory for Municipal and Industrial Waste Facilities and the 1958 Census of Manufacturers (Industrial Water Use). The National Association of Manufacturers is compiling data co-operatively with the National Technical Task Committee on Industrial Wastes, the U. S. Chamber of Commerce, and the Conservation Foundation.

22/ U. S. Department of Health, Education, and Welfare. Public Health Service. Pollution Abatement (Part I of a Report to the Select Committee on National Water Resources, U. S. Senate, 86th Cong., 2d sess., Committee Print No. 9, 1960), p. 18.

million. The costs of handling these wastes, combined with inorganic industrial wastes, is certain to be enormous.[23] A report by the Public Health Service indicates that in dollars industrial pollution control will equal municipal costs when in-plant changes are included. It suggests that industry's annual expenditure for pollution control by 1970 may well be in the area of $750 million.[24] Gordon E. McCallum, chief of the Division of Water Supply and Pollution Control, predicts that it will cost $600 million annually for the next 10 years to bring municipal sewage treatment facilities up-to-date and another $600 million annually in industry expenditures "if our factories are also to keep pace."[25]

Precise magnitudes depend on the extent and stringency of water quality standards. Much depends on the degree of purity which such standards impose either in terms of water classification or effluent standards. Dr. Nathaniel Wollman of the University of New Mexico makes this comment:

> To the best of my knowledge, there are no treatment techniques in use that will remove 97.5 percent of biochemical oxygen demand. I have been told by engineers that when treatment levels go above 85 or 90 percent, one can almost expect to see treatment costs double in going from, say, 90 to 95 percent, and to double again when treatment goes from 95 to 97.5.
>
> And what it would cost to have treatment at 100 percent is anybody's guess, because it is not at present being carried out anywhere, so far as I know.[26]

There is evidence, however, of treatment which can remove 97.5 percent of BOD and more. Allen Kneese points out that the treatment plant at Luton, England produces rather dependable removals in the range indicated. The advanced waste treatment section at the Taft Engineering Center is developing preliminary estimates of the costs of various advanced waste treatment procedures which range up toward 100 percent BOD removal in actual treatment situations.

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[23] See Allen V. Kneese. "Economic Criteria for Design of Regional Waste Disposal Systems" (Paper before the Joint Conference on Water Resources, Delaware River Basin Commission and Water Resources Association of the Delaware River Basin, October 16, 1963), p. 2.

[24] U. S. Department of Health, Education, and Welfare. Public Health Service. Report of the Committee on Environmental Health Problems (Washington: GPO, PHS Pub. No. 908, 1962), p. 252.

[25] Gordon E. McCallum. "The Water Pollution Crisis," Country Beautiful (October 1962).

[26] 1963 Senate Hearings, op. cit., p. 38.

Standards in Pollution Abatement

The standards in effect reflect the community's acknowledgment of the cost to society of pollution and attempts to place the responsibility for bearing such costs directly on the polluters. The magnitude of required investment for industrial pollution abatement reflects too the vigor with which standards are enforced.

General concepts of water quality--the basis for specific standards--have been widely discussed in connection with S. 649, the omnibus water pollution control bill of the 88th Congress which passed the Senate but not the House of Representatives. On January 28, 1965 the Senate passed the legislation as its first major action in the 89th Congress. Section 1(c) of the bill originally provided:

> It is the purpose of this act to establish a positive national water pollution control policy of keeping waters as clean as possible as opposed to the negative policy of attempting to use the full capacity of such waters for waste assimilation.

Assistant HEW Secretary James M. Quigley in a 1961 address before the Izaak Walton League, attacked the concept of utilizing a stream for carrying waste:

> There are still some who hold to the belief that the utilization of a stream as a receptacle of waste is a legitimate use of water, consistent with water pollution control policy. Such a belief finds its basis in the fact that water courses have been used for this purpose all the way back to antiquity. Whatever may have been acceptable or unavoidable in years past, however, it is clear that our goal now and in the years ahead, in an age of vast industrial expansion and rapid urbanization must be to prevent any sort of water pollution.

Loring F. Oeming of the Michigan Water Resources Commission has maintained that while it is possible technically to render water chemically pure, the cost would be prohibitive. The objective should be defined relative to need--to afford a reasonable degree of protection to other users.

Before passing S. 649 (88th Congress), the Senate amended the proposed language in the bill to read:

> The purpose of this Act is to enhance the quality and value of our water resources and to establish a national policy for the prevention, control, and abatement of water pollution.

Among industry groups, conservation associations, state and Federal pollution control officials, there is wide consensus that the polluter must bear responsibility for his actions. There is recognition that times are changing and that standards must be raised. But controversy quickly arises over questions of the degree of stringency of standards, timing of abatement actions, and, finally, the problem of allocation of costs. In a sense the difference of opinion as to a national objective on pollution control turns on such issues rather than on generalized concepts.27/

27/ See Chamber of Commerce of the United States. "A Program for Managing the Nation's Water Pollution" (June 20, 1963), esp. pp. 4-5.

Chapter III

ROLE OF GOVERNMENT AND INDUSTRY

This chapter outlines generally the respective roles of various government bodies and of industry and current programs in attacking pollution. A discussion in depth of the responsibilities of government is presented in the Advisory Commission on Intergovernmental Relations' report on Intergovernmental Responsibilities for Water and Sewage Disposal in Metropolitan Areas.

Government and Industry Responsibilities

Water quality management programs, and particularly pollution control, are a complex administrative problem. Industrial pollution control requires the co-operative efforts of both the private and public sectors of the economy. The public sector undertakes stream and river basin surveys; sets and enforces standards; influences industry-wide action through enforcement and tax policies; establishes reservoirs for low flow stream augmentation; engages in extensive research; trains personnel; and constructs and operates treatment facilities (usually at the local level).

Industry constructs, plans, and operates treatment facilities of its own and engages in in-plant process changes to prevent or reduce water pollution; industry also conducts substantial research activities.

Local

At the local (and state) levels government action is an outgrowth of a residual police power responsibility to preserve the public health. Sewage disposal was not recognized as a municipal problem until after the Civil War. And it has never received as much attention as has water supply.

The emergence of numerous special districts to handle domestic and some industrial wastes is a product in part at least of limited local fiscal resources. The autonomous public authority or special district can avoid local or state constitutional restrictions on indebtedness. At the same time these specialized agencies facilitate area-wide treatment of pollution problems. Contract arrangements in which central cities service suburban areas also are widely used for pollution control and other urban services.

The Municipality of Metropolitan Seattle is an example of a metropolitan-wide agency of broader potential role. Metro Seattle may emerge as a unit of government with authority to enhance the community's capabilities for dealing comprehensively with pollution. However, the Advisory Commission on Intergovernmental Relations has noted: "To the contestants in water politics, each level of government is a different arena, with varying advantages and disadvantages for different participants and the resolution of differing issues. Furthermore, a particular course of action or location of responsibility at the local, metropolitan, State, or Federal level, hardly ever will advance equally a number of planning or policy objectives or values."[28]

State and Interstate

The states have exercised primary responsibility for allocation of water and regulation of water quality. Stream classification, more prevalent in the east, and effluent standards, used by several western states, are the chief tools in setting standards; enforcement is the means by which they are applied.

Interstate agencies and commissions are involved in water quality management. Some deal with localized problems, such as the Interstate Sanitation Commission (New York, New Jersey and Connecticut), which seeks to harmonize pollution control efforts within the Port of New York area. Other interstate agencies deal with pollution problems of large geographic areas.

A recently created Federal interstate agency for the Delaware Basin points to a new pattern of Federal-state partnership. The Delaware River Basin Commission is empowered to develop a comprehensive plan for the water resources of the 12,765 square mile basin. It also is authorized to issue bonds, develop water supplies, control pollution, provide flood protection and recreational facilities pursuant to the plan.

Federal

The Federal government has taken an active and increasingly major role in water pollution control. The Public Health Service since 1912 has been authorized to investigate water pollution from sewage and other sources. Legislation sponsored by Fred M. Vinson and Alben W. Barkley creating a Division of Water Pollution Control in the Public Health Service was passed by both Houses of Congress in 1938. It would have given the Division broad authority to conduct surveys and research, and to make loans and grants to public agencies and private industry. While President Franklin D. Roosevelt concurred in the need for this legislation, he vetoed the act because it sidestepped executive budgetary procedures.

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[28] Intergovernmental Responsibilities for Water Supply and Sewage Disposal in Metropolitan Areas, op. cit., p. 11.

In 1948 the first Water Pollution Control Act was passed and approved, creating the Division of Water Supply and Pollution Control. With subsequent amendments in 1956 and 1961, legislation now authorizes it to undertake a variety of action including research and survey work, training, enforcement, technical assistance, support of state and interstate pollution control agencies, maintenance of the Robert A. Taft Engineering Center in Cincinnati, and a $100 million annual grant-in-aid program to stimulate municipal treatment plant construction.

At present, there is strong opinion in Congress that the unit should be elevated from a subdivision within Public Health to a separate administration in the Department of Health, Education, and Welfare. A provision to this effect is included in the legislation which passed the Senate on January 28, 1965. Under the 1961 legislation, the Secretary was authorized to effect this change administratively, but has not done so.

An argument for placing the Division in the Secretary's office is expressed by Representative John D. Dingell of Michigan, "The water pollution program is buried in the hierarchy over there. The Health Service is health-oriented rather than enforcement-oriented."29/ Many state officials and others do not agree; they feel it would be unwise to reduce the health orientation of the Division.

Industry Responsibilities

Industry and government have co-operated in combating industrial pollution, although there have been and are wide differences of opinion concerning their respective roles. Most major industry groups have established institutes or associations which include among their responsibilities sponsorship of research and development on pollution problems, formulation of industry policies on pollution control, and well organized lobbying activities in behalf of such policies.

29/ New York Times, April 7, 1963, p. 73. See also his testimony before the House Public Works Committee later that year. U.S. Congress. Committee on Public Works. Hearings on Water Pollution Control Act Amendments (88th Congress, 1963-64), p. 35 et seq. (hereinafter referred to as 1963-64 House Hearings).

Industry has also organized on regional bases. The Mississippi Valley Association, comprising business and commerce from the 23 states of the valley and its tributaries, is a well-respected and powerful spokesman for the private economy in this region. It has created a highly articulate committee on water pollution.

Co-operation has been developed to a high degree between industries and State and interstate agencies. The Ohio River Valley Sanitation Commission provides a good illustration. In 1950, ORSANCO's executive committee was directed to explore how channels of communication could best be established with industry:

> The result was the creation of so-called industry-action committees, representing generic groups such as steel, coal, chemicals, oil refining, metal-finishing, and paper manufacturing. For more than a decade these committees, aggregating some 160 members, have been participants in what ORSANCO regards as one of its most fruitful endeavors. The activity has profoundly influenced co-ordination of effort among the states and their industries.[30]

In May 1950, the National Technical Task Committee on Industrial Wastes (NTTCIW) was formed to advise the Public Health Service on industrial aspects of pollution abatement. There are 61 members and alternates from 33 industries on the committee. A secretariat is furnished by the Public Health Service. The committee has adopted certain policy recommendations, including ones on tax incentives, but it focuses on technical questions.

Current Programs

Many existing programs at each level of government stimulate action by industry or assist industry to reduce the incidence of untreated waste effluent discharge.

Research and Development

Virtually every level of government is assisting in finding technical solutions to problems of water pollution. While industry's own research efforts are substantial, they are matched by research in the public sector.

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[30] 1963 Senate Hearings op. cit. p. 237, testimony of ORSANCO Executive Director Edward J. Cleary.

The Federal Water Pollution Control Act states:

> It is hereby declared to be the policy of Congress . . . to support and aid technical research relating to the prevention and control of water pollution, and to provide technical services and financial aid to State and interstate agencies and to municipalities, in connection with the prevention and control of water pollution.[31]

A report of the Federal Council on Science and Technology notes that Federal research programs for fiscal 1964 on physical, chemical and biological characterization of wastes involves an expenditure of $2.5 million. An expenditure of $2.1 million is involved for research during the same period on the effects of pollution on water users and development of quality criteria.[32]

Under Public Health Service auspices current research is directed to the identification of specific organic substances in the effluence of activated-sludge sewage treatment plants. Development of practical methods for characterizing specific industrial process wastes in terms of the effect on water users is also under way. Five research projects, supported with Federal grants, are seeking to determine the pollutional character of industrial wastes.

Research on various other aspects of industrial pollution is being conducted by the United States Geological Survey, the Atomic Energy Commission, the Bureau of Mines, the Department of Agriculture, and the Bureaus of Commercial Fisheries and Sports Fisheries.

Within the Public Health Service much of the research is being carried out at the Robert A. Taft Sanitary Engineering Center. In addition, under the 1961 Federal Water Pollution Amendments seven regional field laboratory and research facilities will be constructed.

Understandably, the emphasis is on research into technical questions. Economic, legal, political, and other social science research generally is not emphasized at government research centers. Yet many of the problems of pollution and water quality management are of a social, economic, and political nature, touching on planning, decision-making and administration.

31/ Federal Water Pollution Control Act, 1(a), 33 U.S.C. 466.

32/ See Report to the President on Water Resources Research, op. cit., passim.

Federal Comprehensive Survey Programs

Allied with research are the extensive surveys of the nation's waterways in developing overall water resource programs. The Division of Water Supply and Pollution Control's comprehensive program development is aimed at tackling pollution control through the interaction of industrial process changes, better land drainage practices, collection and treatment or removal of wastes at their source, and through storage in reservoirs to provide stream flow regulation for quality control.

Low Flow Stream Augmentation

The natural assimilative capacity of a stream depends on the nature and quantity of the pollutants and the amount of water flowing in the stream. Work on low flow augmentation is being carried on by Federal agencies in the development of reservoirs which serve several purposes; collection of water for later consumption, flood control, and augmentation of stream flows as an aid to pollution control.

Training of Industry Personnel; Demonstration Projects

The Federal government also supports training of personnel to deal with water pollution problems, which can be of financial help to industrial firms who might otherwise have to bear the full brunt of such costs by themselves. The Public Health Service provides direct training at its Taft Engineering Center. Courses are given to the practicing engineer and scientists both in public agencies and industry.33/

Under the Water Pollution Control Act the Division of Water Supply and Pollution Control is authorized to make grants in aid for research, training, and demonstration projects, and to award research fellowships. In fiscal year 1964, 203 research grants costing $4.3 million were awarded. Nineteen demonstration grants costing $625,000 were also made to support field study and the construction of prototype equipment. These figures may increase to about $26 million in 1970, to be divided between research ($20 million) and demonstration grants ($6 million). Training grants today cost $2 million. These support 54 training grants and 75 research fellowships. By 1970 an annual expenditure of $5 million is anticipated. The need for such increases is suggested by the widening of specialization in the field and the broader and more comprehensive nature of the water supply and pollution control problem.

33/ See Robert R. Harris. "Statement [on] Training Program" (Prepared for the Subcommittee on Natural Resources and Power, House Committee on Government Operations, 1963).

In May 1962, the Secretary of Health, Education, and Welfare established a policy that research grants will be made only to public or private nonprofit institutions or government agencies and individuals. The possession of an Internal Revenue Service tax exemption identifies eligible applicants.

Chapter IV

ENFORCEMENT

The fundamental objective of enforcement is to assign responsibility for pollution abatement and to impose sanctions for failing to meet such responsibility. Enforcement is defined as a process of code administration in which formal action is taken against a person who fails to comply with requirements of law or regulation. Viewed here more broadly, enforcement encompasses a panorama of means to define responsibility and to influence a socially-desired course of action; the imposition of a sanction is a last resort.

The fundamental economic consequence of enforcement is to put the major financial costs of preventing or treating pollution on industry. Where industrial wastes are discharged into public sewage systems, enforcement proceedings generally will be directed against the municipality or other public agency responsible for the waste treatment. The industrial firms will pay the pro rata share of treatment costs (except to the extent the public agency concerned receives support for its treatment activities from general tax revenues or from state or Federal grants-in-aid). Where wastes are discharged by the industrial firms directly into a public waterway, enforcement will be directed against such firms; the economic impact is to force the firms to pay all direct costs of treatment.

Since standards of pollution are at present set by the states, the costs of prevention and treatment will vary from state to state according to stringency of standards and vigor with which they are enforced. Occasionally this may lead firms to "shop around" for states where standards are not stringent or enforcement is weak. However, other factors usually are more important in making plant locational decisions. Moreover, as a report by the Legislative Council Committee of Tennessee notes, a state which is not strict may find itself short of good water:

> A state would be unwise in the long run to be lax in pollution control measures in the short run. Industries not able or willing to bear the cost of curtailing their pollution would be of doubtful desirability in the long run, and attempting to lure industries to the state on the basis of lax enforcement measures would be a pernicious practice. It should be pointed out that the cost of building treatment facilities into a factory during the construction phase is not nearly so expensive as adding them later. Maintaining reasonably high requirements from the start would be actually doing the industry, as well as the public

a distinct favor.[34]

Federal Enforcement

The interstate nature of some pollution, particularly as it affects major navigable waterways, was a factor in the establishment in 1948 of a Federal program of water pollution enforcement. There was, moreover, concern with pollution generally as a drain on national water resources.

The Federal program was substantially expanded through amendments in 1956 and again in 1961.[35] Even broader jurisdictional changes have been proposed in the omnibus water pollution bill of the 88th Congress (S. 649), and the 1965 legislation which passed the Senate January 28, 1965.

Under the present Federal Water Pollution Act, the United States, through the Department of Health, Education, and Welfare may initiate formal enforcement measures where pollution of interstate or navigable waters in one state endangers the health or welfare of persons in another state. Action may be taken (1) at the request of the governor or water pollution agency of a state, or (2) on the initiative of the Secretary of Health, Education, and Welfare where, on the basis of reports, surveys, or studies, he has reason to believe that pollution subject to abatement under the Federal act, originating from discharges in one state, endangers health or welfare of persons in another state.[36]

In cases involving intrastate pollution, the United States may also intervene upon the invitation of the governor. Before taking any such intrastate case to court, permission must again be obtained from the governor. On the other hand, the Secretary of Health, Education, and Welfare need not institute enforcement action in an intrastate case when so requested by a governor, if, in the Secretary's judgment, the case is not significant enough to warrant Federal action.

The Federal Act specifies three steps in Federal enforcement procedures involving (1) convening of a conference, (2) public hearing, and (3) court action by the U.S. Attorney General.

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[34] David H. Grubbs and Richard G. Sheridan. "Special Memorandum on Water Resources and Related Lands" (Tennessee Legislative Council Committee, 1962), p. 20.

[35] See for text P.L. 660 (84th Congress) and P.L. 87-88, 33 U.S.C. 466g.

[36] 33 U.S.C. 466g(c)(1), Federal Water Pollution Control Act 8(c)(1).

1. Conference. The first step is the calling of a conference by the Secretary of Health, Education, and Welfare. Participants include representatives of the United States, the states concerned, and the interstate pollution control agency, if any. Municipalities, industry representatives, and other interested parties also may participate.

The purpose of the conference is to provide a forum for bringing all interested parties together; to ascertain the magnitude of the situation; to discover what remedial action is being taken by the states, municipalities, and industry; and to try to define co-operatively a future course and schedule of any needed remedial action. If no significant lag in abatement is found after the first session of a conference, it may adjourn and the Federal government may step out. In any event, the Secretary of HEW prepares a summary of conference discussions, including indications of pollution of interstate or navigable waters and of the nature of delays, if any, being encountered in abating the pollution.

In other instances, a second conference may be scheduled to measure progress and to discuss the need for further remedial action. Few cases have gone beyond the conference stage. This is a point emphasized by the Federal government to demonstrate that they do not intend to encroach on state prerogatives, and criticized by those who feel the Federal effort is at best half-hearted.[37]

2. Public Hearing. The Secretary of HEW may call a formal public hearing if he is not satisfied with the results of the conference. A six-month waiting period must intervene between conference and hearing. The report on the hearing is forwarded to the Secretary who may issue appropriate compliance orders. However, the Secretary must allow the municipalities and industries concerned a reasonable time--at least six months-- to comply with the order.[38]

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[37] See, for example, the remarks of Congressman John D. Dingell of Michigan, 1963 Senate Hearings, pp. 490 et seq., and 1963-64 House Hearings, op. cit., pp. 35 et seq. See also James Ridgeway, "Gunboats on the Raritan," New Republic (June 1, 1963), pp. 17-19.

[38] The statute provides that after a hearing by a five-man hearing board, the Secretary of Health, Education, and Welfare shall send "such findings and recommendations to the person or persons discharging any matter causing or contributing to such pollution, together with a notice specifying a reasonable time (not less than six months) to secure abatement of such pollution, and shall also send such findings and recommendations and such notice to the state water pollution control agency and to the interstate agency, if any, of the state or states where such discharge or discharges originate." 33 U.S.C. 466g(e), Federal Water Pollution Control Act, 8(e).

3. Court Action. If the Secretary of HEW feels that there has not been satisfactory compliance with his order, he may refer the case to the Attorney General of the United States to initiate a suit on behalf of the Federal government to secure abatement of pollution. As noted above, in intrastate cases, the governor's consent is required.[39] There has been only one instance of such a referral, involving a municipality, and the matter was settled by an order at the pretrial stage.

Under proposed legislation the enforcement jurisdiction of HEW would be substantially widened, particularly as to intrastate pollution of navigable waterways and their tributaries. Moreover, the bill would authorize the establishment of Federal pollution control standards.

State Enforcement

The states establish standards of control over their own waterways, either singly or in concert with sister states (as in the case of the New England Water Pollution Control Commission). Most states use a variety of pollution control measures including review of plans and permit requirements, and avoid if at all possible such formal enforcement proceedings as court action and the imposition of sanctions. State officials and industry representatives emphasized in interviews conducted as part of this study the wide co-operative efforts to work out feasible economic and technical solutions with industry.

In 20 states the responsibility for pollution control is located in the health department; an equal number of states lodge responsibility in an independent commission; and in 10 states statutory agencies have been created to direct the work of the pollution control agency. In a significant number of instances, industry is well represented on the board, emphasizing its capacity to influence state pollution control policy.

Political Issues

Political lines concerning pollution control have been drawn around two questions: Who should enforce and at what pace? The states and industry have pushed for primary jurisdiction by the states. There has been widespread opposition, for example, to broadening Federal controls. On the other side are those who feel that time is running out; that broader Federal activity is needed.

The United States Chamber of Commerce while leaning heavily in favor of state supremacy, recognizes that the Federal government's authority may have to be invoked. A policy statement of the Chamber contains this clause:

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[39] 33 U.S.C. 466g(f), Federal Water Pollution Control Act 8(f)

> While recognizing the primary responsibility and authority of the states, there should be adequate Federal authority in the background to be invoked if and when the state demonstrates either inability or unwillingness to do its own job on pollution problems. Potential new sources of pollution should be under careful scrutiny. In all public activities with respect to pollution control there should be full opportunity for local, municipal, and industrial representation.[40]

The National Association of Manufacturers, in its policy statement on water quality control, states that "State and local responsibility in this area should not be weakened through Federal subsidies and Federal enforcement actions. Federal regulation is particularly ill-fitted for this field since every water problem is different. Blanket requirements imposed on a national basis would be highly unrealistic and result in unjustified economic costs, both in terms of job opportunities and in terms of this country's competitive position in world markets."[41]

Some state officials resent Federal interference, claiming that they (the states) were there first; their jurisdiction under the state's police power is primary; and that they are doing a good job. They believe the Federal government's job is to aid in finding technical solutions and in supplying money to help construct treatment plants and to support state and interstate water pollution control agencies.

Assistant HEW Secretary James Quigley, an outspoken former member of the House of Representatives from Pennsylvania, acknowledged the right of state pollution control administrators to fight against Federal involvement. However, speaking before the Association of State and Interstate Water Pollution Control Administrators in December 1962, Mr. Quigley admonished his department's critics:

> . . . let's face it, that fight is now over and done. The Federal government is in the water pollution control business. This is a plain unvarnished fact.

Moreover, he chided the administrators for quibbling "over every technicality" and using dilatory tactics where the Federal government attempts to carry out its responsibility.

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[40] Chamber of Commerce of the U.S.A. 1963-1964 Policy Declarations (Washington: 1963), pp. 116-117.

[41] National Association of Manufacturers. Industry Believes, 1963. (Policies on Current Problems as Adopted by the Board), p. 41.

State legislatures and state agencies are influenced more heavily by local political forces than are Federal agencies and the Congress; the spokesmen for no control or loose controls are likely to predominate at the local or state levels, where the interests favoring strict control are not likely to be so well-organized. Even the industries which would stand to gain by pollution control are seldom willing to put forth the same effort for potential gains, as those who would stand to lose by having to assume all or part of the cost of abatement.

Of course, some of the nation's greatest polluters are municipalities. As long as they display such a lack of civic rectitude respecting their own affairs, they cannot be expected to take much interest in controlling pollution by local industry, particularly since the existence of an industry in a locality is likely to be a benefit which outweighs the cost of the industrial pollution to that locality. In other words, the competitive forces which work against effective state enforcement are even greater obstacles to municipal enforcement.

Control Through Government Contract Specifications

Government contractors are required to comply with Federal regulations-- such as those on discrimination and fair labor practices to help achieve national objectives. Is it feasible to use the contract device as a means of compelling contractors to prevent pollution or provide adequate treatment?

Under this arrangement a condition precedent would be established to the awarding of most government contracts. It would involve submission of satisfactory evidence by bidders and others proposing to perform services or supply equipment to the Federal government showing that the work to be performed under the contract or any major subcontract thereof will not be undertaken at plants discharging effluents directly into streams or other waters in violation of standards imposed by a state or local jurisdiction. Some degree of flexibility would have to be allowed to take into account those plants which, in the judgment of state pollution control agencies, are making substantial remedial progress. Of course, in the light of obvious pressures, a state agency would not want to hinder unduly the awarding of government contracts to plants within the state. Thus it might rule too readily that pollution standards are being met or satisfactory remedial action is taking place. Under these circumstances such ruling should perhaps be subject to review by the

Division of Water Supply and Pollution Control in the U.S. Public Health Service.*

In any event, it seems unlikely that the Federal contracting agencies would constitute an effective enforcing mechanism. Their sympathy is likely to be with the work of the agency rather than with the public interest in water pollution control. This factor would increase the case for giving the final decision over the question of not allowing the award of a government contract because of the failure to abate pollution to the Division of Water Supply and Pollution Control. However, urgent national defense priorities, international obligations, and the like may intervene as mitigating factors requiring, ultimately, that the final decision be left to the contracting Federal agency.

All in all, this approach does not appear to be a particularly suitable weapon for effectuating pollution abatement from industrial sources.**

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* It is interesting at this point to compare a recent revision of the Bureau of the Budget's Circular A-11, which provides: "Estimates for the design and construction of Federal facilities and buildings will provide for the installation of air and water pollution control and treatment systems, in accordance with instruction issued by the Public Health Service." Conceivably, a similar approach could be developed for government contractors.

**It should be noted that the discussion of the government contract device involves the merits of a possible future governmental policy, not an ongoing program. Thus, it should be compared to other possible new policies, which are discussed in Chapters V-VIII. The material has been included as part of the chapter on enforcement because it involves a "handle," i.e., the conditions under which a government contract is awarded, by which the government can regulate an important segment of American industry.

Chapter V

ECONOMIC ASPECTS OF POLLUTION

The root of the pollution problem is that the water which polluters pre-empt for their own use is a scarce resource; pollution restricts or prevents the use of the water by others to whom its use is valuable. It requires them to incur substantial costs to make water suitable for reuse. In essence, the polluters do not pay the full economic cost of the water which they use and discharge, nor the economic cost of polluting the receiving waters. Such costs are measured by the values of uses to which water could be put if not polluted, or by the costs of pollution abatement.

Many of the costs involved can be measured quite precisely but others are difficult to quantify, such as the impact on community morale of a stream which is destroyed as a source of aesthetic and recreation values. Such costs tend to increase over time, as population grows and alternative uses of water increase. Many of the polluting industries were established at a time when their pollution caused relatively little damage to others.

The economic principle which should govern here is that each firm which pollutes should pay the cost of abatement up to the point where any additional expenditure for pollution control is equal to or greater than the costs to others of the additional pollution which could be abated.

Part of the total economic costs of pollution are analogous to other production costs which industry has been required to meet, such as costs of sanitary facilities for workers, of safety equipment, of workmen's compensation, and of unemployment (the last are charged against industry in the form of an unemployment insurance tax).

If the market system is to provide efficient decisions with respect to resource allocation, costs should be borne by the firm causing them. In the short run costs of pollution abatement may result in reduced profits for individual companies or industries. In the long run, however, the costs of pollution abatement borne by industry ordinarily would be added to the price of its products. Such products naturally would have a less advantageous competitive position than would be the case if their prices did not reflect the costs of pollution; and eventually the resources used in them would decline relative to those used in competitive products. In general this is the way in which the price-market system allocates resources in accordance with demand in the long run.

These tendencies, however, break down if some products but not others are subsidized. Where production costs, such as economic costs of pollution, generated by a firm are borne by other persons, firms, or governments, there is in effect a subsidy to the producing firm. Subsidies may be direct, as payments directly to the firm; they may be indirect, as Firm A incurring costs for treating pollution caused by Firm B. Another form of indirect subsidy is the sacrifice of recreational and similar uses of water by individuals because of pollution generated by a firm.

Most present-day pollution involves a system of subsidies which has grown up largely by accident. Assignment of subsidy has tended to be haphazard. The firms which have been responsible for pollution have tended to be better organized politically than the groups damaged by pollution. Moreover, the costs of pollution to such groups are indirect and diffused, and therefore may not be immediately perceived, while the direct costs of pollution abatement or control are immediate and obvious. But as the indirect economic costs of pollution of the community's waterways mount--such as restraint on economic and social development--they become increasingly apparent.

The haphazard system of partial subsidies is inequitable and inefficient. It should be replaced by a system in which the polluter is eventually asked to pay the costs of pollution. The payment can be through effluent charges which help to defray the cost of government disposal systems. Or, more likely, it can be through private installations that prevent or treat waste products.

The long run objective, then, should be that firms contributing to pollution should meet the full costs of pollution abatement. The sudden removal, however, of a subsidy system is likely to cause hardships to many firms who must install expensive equipment for pollution abatement. Hence, there have been many proposals for direct assistance in some form to ease the burden on the firms involved, and to expedite pollution control. Such assistance would not initiate a subsidy system; rather, in most cases, it would substitute direct subsidies for previously existing indirect subsidies. The direct subsidies would be designed to ease the pains involved in the shift of responsibility for meeting the economic costs of pollution.

Subsidies if properly conceived can complement enforcement of pollution control requirements. They may reinforce informal community pressures and formal Federal and state enforcement measures as incentives to abate and prevent pollution.

The following chapters examine the incentive aspects of alternative forms of subsidy. Chapter VI considers alternative forms of assistance by the Federal government to aid private firms in acquiring facilities for pollution treatment. Chapter VII of the report considers state and local tax incentives. In Chapter VIII, we consider the case for diverting industrial wastes to public sewage systems for treatment and ultimate discharge by public agencies organized on a municipal or areal basis; some of the costs can be borne by firms through effluent charges. Finally, Chapter IX draws several conclusions on the points discussed in the report, but refrains--for reasons noted in Chapter I--from making specific recommendations.

Chapter VI

FEDERAL INCENTIVES

The first section of this chapter examines the various ways in which the Federal government can aid and motivate private firms to build facilities for pollution control. It compares their financial implications in terms of benefit to the firm and cost to the government. The second part summarizes existing or proposed legislation and other factors concerning these forms of assistance.

PART I. ECONOMIC ASPECTS OF FEDERAL INCENTIVES

Incentives Through the Federal Income Tax

There has been wide discussion of two schemes for preferential tax treatment. One is accelerated depreciation; the other is a special tax credit which would double the 7 percent investment tax credit now on the books and constitutes a virtual price reduction in the cost of the new plant and equipment. It is analogous to direct cash grants.

Accelerated Depreciation

Accelerated depreciation can take various forms but for discussion purposes we assume an ultimate acceleration, namely, 100 percent write-off the first year.

The benefit to a company of immediate 100 percent write-off consists of the difference in the present value of the flow of internal funds that can result from this procedure on the one hand, and on the other hand, from depreciation schemes presently in effect. In order to explore the amount of this benefit it is necessary to describe the usual depreciation methods and the internal funds thereby provided.

The depreciation accrual for any given year constitutes a business expense in that year; total taxable income is reduced by the amount of that expense. But unlike most other business expenses, depreciation accruals do not result in a flow of cash out of the business and they remain theoretically as a source of funds with which to replace plant that wears out. But accruals have an additional influence on cash remaining in the business. Since the depreciation charge increases expenses, it decreases taxable income and, in consequence, decreases also the taxes that are paid on that income.

Consider a company subject to a 50 percent Federal income tax with net taxable income of $10,000. This company now contemplates investing $30,000 in a pollution treatment facility. The firm expects the facility to last 10 years and customarily depreciates on a straight line basis so that annual depreciation would be $3,000. If the project goes through, current expenses will be increased by the $3,000 depreciation accrual and current taxable income will be $7,000 instead of $10,000. Federal taxes, accordingly, are now $3,500 instead of $5,000. The difference, $1,500 represents a reduction in current expenses--that of taxes--and a corresponding larger current after-tax income than would have been the case had the capital investment not been undertaken. The extra $1,500 would continue to appear for the next nine years (assuming before-tax income remained at least $3,000).

Fifteen hundred dollars to be received next year is not worth as much as $1,500 today. The latter can be used to earn income in the interim. The amount by which we discount future relative to present income depends on several things--for example, the amount funds are expected to earn, the assurance with which expectations are held, and what must be paid for funds over the interval. An allowance for these gives the "present value" of future receipts.

The preference for income today vis a vis tomorrow provides a handle by means of which it is possible to lighten the financial burden of a company investing in pollution treatment equipment. The earlier a company is allowed to write-off a plant, other things the same, the more advantageous it is. The longer opportunity to benefit from the use of the additional internal funds that are thereby provided constitutes a partial counterweight to the commitment of capital funds to pollution control which, presumably, offers little direct addition to earnings.

What, then, is the amount of the advantage to a company of a special measure permitting immediate write-off of all investment in a plant and equipment acquired to effect pollution control? As mentioned above, we consider only the extreme form of accelerated depreciation--100 percent in the first year--but a write-off in three or even five years could be substituted.

The value of this allowance depends primarily on four factors (always assuming for the purpose of the argument that taxable income is large enough to permit the benefits to take effect): (1) the tax bracket, (2) the period over which the capital cost can be written off, (3) the rate of interest on borrowed funds or more generally, the time-discount rate, and (4) the method of depreciation allowances that is used. The period is generally the expected useful life of the facility, unless two special rules in depreciation are used, which in effect shorten the write-off allowance.

At present, the current operating costs of pollution control activities by industry can be deducted from Federal income tax. These expenses may be deducted in the year in which they are incurred. But, as noted, capital expenses (other than land which is not depreciable) are deducted according to one of a number of acceptable depreciation schedules.* For corporations earning over $25,000 annually, the rate of tax under the Revenue Act of 1964 is 50 percent for 1964 and 48 percent for subsequent years. For corporations with taxable income of $25,000 and under, the rate under the 1964 law is 22 percent. For partnerships and individually-owned businesses which are not incorporated, the personal income tax rates apply. Firms subject to state business income taxes from which they may also deduct abatement costs may recover somewhat larger amounts. Allowing for the fact that the state tax is deductible from the Federal, the total deduction probably would not exceed 53 percent in 1964. (The deduction will be even less in subsequent years when the rate drops to 48 percent.)

This does not mean, however, that the present value of the after-tax flow of internal funds amounts to 53 percent of the cost of the asset.

The impact of these elements are summarized in Table 2. The sections develop figures for equipment having a 10-year life and a 20-year life. Three illustrative time-discount rates of 6, 10, and 15 percent cover a representative range. Depreciation systems in common use are of three sorts. The first, straight line, assumes equal annual deterioration over the expected useful life. The other two assume more rapid depreciation in earlier than in later years; they are known as the "sum of the years' digits"** and "the double declining balance"*** methods.

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*In 1961 a Federal court of appeals rejected a lower Federal court ruling which allowed a woolen mill to deduct as an ordinary and necessary business expense the costs of a pollution treatment plant which had been constructed to meet state requirements. That is the district court allowed the full costs to be deducted in the year incurred. The court of appeals held that the facility was a permanent addition to the mill and its costs had to be deducted, for tax purposes, over its useful life. Woolrich Woolen Mills v. United States, 289 F 2d. 446 (1961).

**Sum of the Years' Digits Method. The depreciation allowance is determined by dividing the initial investment each year by the number of years remaining in asset's life. An example, assuming a 10-year life for an asset of $1,000, illustrates the calculation. Total cumulative years of asset life. $10+9+8+7+6+5+4+3+2+1 = 55$. First year depreciation is \$1,000 X $\frac{10}{55}$; second year's, \$1,000 X $\frac{9}{55}$.

***Double Declining-Balance Method. For an asset of $1,000 with a 10-year life, straight line depreciation would be 10 percent each year. By the double-declining balance method, the firm may deduct 20 percent the first year and 20 percent of the declining undepreciated values each succeeding year. Since the method never permits 100 percent depreciation, some terminal financial adjustment must be made.

TABLE 2

COMPARISON OF IMMEDIATE WRITE-OFF FOR DEPRECIATION COMPARED WITH CONVENTIONAL DEPRECIATION METHODS PER $1,000 OF CAPITAL INVESTMENT IN POLLUTION TREATMENT FACILITIES*

Depreciation Method	Discount Rate Of: 6%	10%	15%
	10-Year Life		
1. Immediate 100 percent write off**	$500	$500	$500
2. Straight line	368	307	251
3. Advantage (line 1-2)	132	193	249
4. Sum of the Years' Digits	400	350	302
5. Advantage (Line 1-4)	100	150	198
	20-Year Life		
6. Straight Line	272	213	156
7. Advantage (line 1-6)	228	287	344
8. Sum of the Years' Digits	338	273	218
9. Advantage (line 1-8)	162	227	282

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*The figures give the present value of the after-tax funds retained by virtue of the depreciation accrual (assuming firms are in a 50 percent income bracket and have profits sufficient to realize on the tax savings).

**We assume an immediate write off rather than one at the end of the year which would imply a year's interest charge.

The table shows that if a firm uses the straight line method, 10-year life, and a time-discount rate of 10 percent, the present value after taxes of the funds retained in the business as the result of depreciation accruals is $307 for every $1,000 of initial investment. But if this company had been permitted and was willing to write-off the entire investment in the first year, there would be a gross retention of sales dollars attributable to the depreciation accrual of $1,000 and an after-tax retention of $500. Thus, the extreme accelerated depreciation would improve the present value of the retained earnings by $193 ($500 - $307).

This means in a sense that the company is receiving $193 back on the $1,000 it invested. Thus, in effect, it has received the equivalent of a price reduction of 19.3 percent on the purchases it made.

Of course, if a firm is already utilizing one of the methods that presumes heavier depreciation in the earlier years, the advantage in the one-year write-off is somewhat less marked. Under the sum of the years' digits method, for example, the 10 percent discount rate provides a present value of $350, relative to which the immediate write-off affords an advantage of only $150.

Other columns in the table show that as discount rates increase, present value decreases under conventional depreciation methods, other things the same, and therefore, the advantage of the special write-off increases. The table also shows that a longer useful life means a lower present value and, therefore, a greater advantage of the immediate write-off. For example, if the firm used the 20-year life, the sum of the years' digits method and a 10 percent time-discount, the present value of the accruals would be $273 relative to which the immediate write-off affords an advantage of $227.

These figures apply to large firms in a 50 percent income tax bracket. Firms that have taxable income of $25,000 or less are subject to a 22 percent tax. If the firm were relatively small and if its capital investment were scaled proportionately it might also be in a position to benefit from the immediate depreciation provision though to a somewhat smaller extent. For example, if the company used a 10 percent discount rate and straight line depreciation, the immediate write-off provision would improve the present value of retained earnings by $85 on every $1,000 of investment (assuming the firm has sufficient profits to realize the tax savings), as compared with $193 applicable to the large profitable firm.* For other discount rates, methods of depreciation, or equipment life, comparable differences appear.

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*Before-tax depreciation accruals per $1,000 of investment are, of course, the same for the small and large profitable firm. At the 10 percent rate, and a 10-year life, present value of the total depreciation accrual is $614.50. But taxes remove 50 percent or $307 of this sum for the large, and only 22 percent or $135 for the small, firm--Table 2, line 2, column 2. With the immediate tax write-off of $1,000 the tax saving is 22 percent or $220 (assuming the firm has profits against which the taxes can be charged). Thus, $220-$135 = $85.

Investment Tax Credit

The Internal Revenue Code allows a 7 percent credit on corporate income taxes for capital investments (other than for land). The effect of a tax credit is much the same as an opportunity to purchase the plant at a lower price. The firm is now permitted to reduce the tax paid to the Federal government by an amount which is 7 percent of the expenditure for the capital investment. Of course, not every firm is able to take advantage of the provision because the amount of taxes owed the government may be less than the credit allowed. This is true particularly of new firms with little taxable income and of firms which have incurred losses. If the amount of the credit exceeds certain statutory limits, the excess credit cannot be taken in the first year but must be applied in other years.

To equal the effect of the immediate write-off privilege, which as noted earlier can also be likened to a price reduction, a special additional tax credit would have to be granted for investments in waste treatment facilities. This addition would have to amount to 10 percent to be equivalent to the least advantageous of the several alternatives presented in Table 2. To equal the advantages of the other alternatives in Table 2, it would range between the 10 percent (sum of the digits method, 6 percent rate, 10-year useful life) to 34 percent (straight line method, 15 percent rate, 20-year useful life).*

Other Incentive Devices

Grants

Another device which may be considered is a subsidy in the form of direct cash payment to defray part of the cost of a firm's capital investment in pollution treatment facilities. This method of assistance is discussed in more detail in Part 2 of this chapter. But it is useful to note at this point that its impact can be measured in exactly the same way as that of the investment tax write-off. There are, however, two significant differences: (1) the firm can benefit from the cash grant whether or not it has taxable profits equal to or greater than the tax credit, and (2) the cash payments may be used to subsidize investments in land.

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*Since depreciation can be taken on the full amount of the investment (before the credit), this constitutes a slight additional advantage.

Low Cost Loans

One further measure contemplates low-interest loans by the government for the purpose of financing investment by firms in pollution treatment facilities.

Table 3 shows the advantage, in terms of the present value, of financing at 3 percent rather than at the higher rates, such as the 6 to 15 percent rates used for previous comparisons. These can be visualized as representing anything from the borrowing rates offered by the Small Business Administration (5-1/2 percent loans over 10-year periods) to the hypothetical earnings rate on invested capital--the opportunity costs of using these funds for other purposes.

The advantage may be measured by the present value of the effect of the loan on funds retained in the business after taxes by virtue of the depreciation accrual. If these funds are judged to be capable of earning 6 or 10 percent a year and only cost 3 percent, the difference constitutes a reduction in the impact of the pollution treatment investment. Here, as in the case of the immediate depreciation write-off, the advantage differs depending on the depreciation method, the earning rate and the estimated life of the facilities. For example, for a 10-year life, straight line and 10 percent time-discount, the advantage is $119 on each $1,000 of investment. For a 20-year life, it would be $159; the table shows a number of other comparisons.

The several types of government subsidy that have been discussed have differing power to lighten the burden of private firms that undertake capital investment in pollution treatment facilities. The figures are brought together in Table 4 for the illustrative case of 20-year life and 10 percent time-discount.

Costs of Alternative Forms of Assistance and Summary of Benefits

These several devices also have different impact on the Federal Treasury and it may be useful to make some rough calculations of the orders of magnitude. These must be very rough since many relevant factors cannot be taken into account. We assume a 3 percent per annum cost of Federal funds. This is approximately the average present cost of funds rather than the cost of new funds which is more nearly 4 percent. Which of these and indeed other alternative rates should actually be used is a moot point.

For immediate depreciation write-off, the cost to the Treasury the first year is the amount of the tax loss attributable to this enlarged depreciation accrual. For firms in the 50 percent tax bracket with adequate profits, this would be $500 on each $1,000 of investment. But in subsequent years, the Treasury receives taxes which would otherwise

TABLE 3

COMPARISON OF ADVANTAGE OF FINANCING INVESTMENT IN POLLUTION TREATMENT FACILITIES BY LOW COST LOANS AND CONVENTIONAL FINANCING METHODS PER $1,000 OF INVESTMENT*

Depreciation and Financing Method	Discount Rate Of: 6%	10%	15%
		10-Year Life	
Straight Line Depreciation			
1. Low Cost Loans (3%)	$426	$426	$426
2. Conventional Financing	368	307	251
3. Advantage (line 1-2)	58	119	175
Sum of the Years' Digits Depreciation			
4. Low Cost Loans (3%)	445	445	445
5. Conventional Financing	400	350	302
6. Advantage (line 4-5)	45	95	143
		20-Year Life	
Straight Line Depreciation			
7. Low Cost Loan (3%)	372	372	372
8. Conventional Financing	272	213	156
9. Advantage (line 7-8)	100	159	216
Sum of the Years' Digits Depreciation			
10. Low Cost Loans (3%)	406	406	406
11. Conventional Financing	338	273	218
12. Advantage (line 9-10)	68	133	188

*The figures give the present value of the after-tax funds retained by virtue of the depreciation accrual (assuming firms are in a 50 percent income bracket and have profits sufficient to realize on the tax savings).

TABLE 4

COMPARISON OF ADVANTAGES OF ALTERNATIVE FORMS OF FEDERAL ASSISTANCE

Type of Subsidy	Specific Value	Advantage Per $1,000 of Capital Investment
Immediate Depreciation Write-Off of 100%	Assuming 50% tax rate, equipment has 20 year life, 10% discount rate	
	And Straight Line Method	$287
	And Sum of the Years' Digits Method	227
Additional Investment Tax Credit or Cash Payment	7 percent	70
	14 percent	140
	21 percent	210
Low Cost Loans, 3% Rate	Assuming 50% tax rate, equipment has 20 year life, 10% discount rate	
	And Straight Line Method	159
	And Sum of the Years' Digits Method	133

have been reduced by the normal depreciation accruals. The present value of this stream of receipts over the depreciable life of the equipment, discounted at the Federal borrowing rate of 3 percent, constitutes a reduction of the first year's cost; for equipment with 20 year life and straight line depreciation, it would be $372. The net cost to the Treasury is, therefore, $500-372 or $128; the corresponding advantage to the firm with a 10 percent discount rate (relative to having no governmental assistance) is $287. The difference in these two figures reflects the difference in the time-discount rate appropriate to the government and to a private firm.

For the investment tax credit the initial cost to the Treasury of the amount of the credit is not reduced by subsequent effects. Thus, the gain to the private firm is obtained at the expense of an equal cost to the government. A like statement applies to an outright cash payment.

As to low costs loans, if the Treasury lends at the rate at which it borrows, and if we assume Treasury borrowing is unlimited, the cost is confined to administrative and risk considerations. Since funds are not unlimited, the benefit from alternative use of funds must be thrown in the balance, though for this we cannot set down a figure. If the Treasury lends at less than the rate at which it borrows, the difference constitutes a cumulating cost over the life of the asset. For example, the appropriate cost to the government is often thought to be that of the new borrowing rate which is about 4 percent. If it borrowed at 4 percent and loaned at 3 percent, this 1 percent on, say, $1,000 for a 20-year period, which cumulates to $200 discounted at a 3 percent rate, has a present value of about $160. This difference, in other words, can mount up fast.

In addition to these benefit-cost considerations, several other factors should be noted, which may affect the overall feasibility of one or another device.

One general advantage of Federal incentives, compared to say, exemption of pollution control facilities and equipment (and land) from local property taxes, is the fact that the Federal devices would be uniform in application. They would not be affected by the location of a plant in one state or another. Only a single Act of Congress would be required to authorize a program of Federal assistance, whereas the 50 state legislatures would have to act if uniformity were desired via state and local legislation.

However, Congress has not as yet approved any special incentive device applicable to the acquisition by private firms of pollution control equipment. Preferential tax legislation in particular is very difficult to achieve. And what finally gets enacted may be quite different from what is originally proposed.

Another factor to be considered is the already very complicated nature of the Internal Revenue Code; adding more complexity is, generally speaking, undesirable. The technical burdens imposed on the Internal Revenue Service would add to its already heavy administrative load.

The analysis has indicated that inducement via accelerated depreciation constitutes the best buy for the government dollar. However, it has the disadvantage of ambiguity as to cost of the total program. While definite limits can be placed on the magnitude of a grant or low cost loan program this is not possible in connection with the write-off provision. Though there is a cumulating experience concerning the stimulating effect of accelerated depreciation on investment, estimates as to the use made of the program would be subject to wide margins of error. In consequence the amount of the government subsidy would likewise be difficult to prejudge.

And, finally, as we have seen, there is the primary issue of how much financial assistance is justified, in light of the basic principle that each polluter should pay the social costs of his pollution. We have seen that the justification for departure from this principle is to assist firms in avoiding severe economic or financial harm due to strict enforcement of the principle, and to induce them to act. If the amount of assistance is low, it may not provide any real incentive, and if the assistance is high, it may violate the basic principle by having the government absorb a large proportion of the firms' costs of pollution control.

PART 2. GOVERNMENT PROGRAMS RELATING TO FEDERAL INCENTIVES

Against this background, it is worthwhile to discuss in some detail the history of legislation relating to Federal forms of assistance for industrial pollution control, as well as other government programs which are relevant to the current discussion.

Legislation on Accelerated Depreciation

There is a long history of interest in and legislation on accelerated depreciation. Here we consider only its application to pollution problems. Proposals for depreciation that is more rapid than presupposed by the useful life have been of many kinds and degrees. The previous discussion has centered on the ultimate degree--100 percent write-off in the first year. The history of other measures is based on the same general principles although the particular form varies.

The first bill to authorize accelerated depreciation for pollution treatment capital outlays was introduced on September 10, 1945 (79th Congress, 1st Session) by Representative Bailey and by Senator Harley

Kilgore. It proposed to allow amounts paid for the construction of facilities for the treatment of industrial wastes as a deduction in computing net income during a six-year period, i.e. six-year write-off. In June 1949, Representative John W. Byrnes of Wisconsin introduced H. R. 5089 providing for accelerated amortization over 60 months of amounts paid for industrial waste treatment works for income tax purposes. Alternatively, the bill allows the deduction during any of the four taxable years following the taxable year in which such expenses are paid or incurred.

A more recent proposal was S. 736 (88th Congress) introduced on February 7, 1963 by Senator Abraham Ribicoff of Connecticut, on behalf of himself and 16 other senators.42/ Senator Ribicoff's bill dealt with both air and water pollution. Representative John A. Blatnik of Minnesota introduced H. R. 5167, similar to S. 736, but limited only to water pollution.43/

S. 736 amends the Internal Revenue Code of 1954 (Ch. 1, Sub. Ch. B, Part VI), adding a new Section 183. Under the new section a taxpayer may elect to treat expenditures paid during the taxable year in connection with any certified water pollution control treatment works (or similar air pollution works) "as expenses which are not chargeable to capital account. The expenditures so treated shall be allowed as a deduction."

The term "certified water pollution control treatment works" is defined as:

> . . . any facility, land, buildings, machinery or equipment, or any part thereof, used to control water pollution by removing, altering, or disposing of waste from any type of manufacturing process, including the necessary intercepting sewers, outfall sewers, pumping, power, and other equipment, and their appurtenances.

42/ Senators Bible, Boggs, Cannon, Dodd, Hart, Humphrey, Inouye, Kuchel, Long (Missouri), Magnuson, McGee, Randolph, Williams (N.J.), Muskie, McIntyre, Pell. For House companion bill see H.R. 5849 introduced April 24, 1963 by Representative Robert N. Giaimo of Connecticut.

43/ Unlike the Ribicoff bill, H. R. 5167 contains two "whereas" clauses, which summarize the basic argument for the bill. The first clause states, "One of the major problems in the abatement of water pollution is the elimination or purification of industrial waste through the construction of costly and nonproductive treatment works by private industry." The second clause states, "It is necessary and desirable to assist and encourage private industry to provide such treatment works."

The provision applies only to facilities constructed or acquired after December 31, 1962. A certificate to establish eligibility must be issued by a state water pollution control agency to the Secretary of Health, Education, and Welfare, stating that the equipment has been constructed, erected, installed, or acquired in conformity with state requirements for the control of water pollution. The Secretary of HEW, in turn, must certify to the Secretary of the Treasury that the facility is:

> . . . beneficial to the control of water pollution and furtherance of the general policy of the United States for cooperation with the states in the prevention and abatement of water pollution under the Federal Water Pollution Control Act.

There are similar provisions governing air pollution treatment facilities. Excluded from the benefits of the provision are treatment works which are reasonably expected to give the taxpayer a profit.

In a Senate speech Mr. Ribicoff summed up the principal case for his bill:

> If we are to clean up our air and our water, a large part of the job must be done by private industries at the local level. But we cannot simply point the finger at private industry and say, 'You are causing some of the pollution--do something about it.' We must frankly recognize that the purchase and installation of equipment to control pollution is a big expense. And unlike many capital outlays that ultimately produce new profits, these costs basically serve the health and safety of the public. Therefore, there must be some public sharing with private industry of the economic impact on these expenditures.
>
> Under existing Federal laws, expenditures for treatment works to control water and air pollution must be capitalized and the cost deducted as depreciation over the usual life of the machinery or equipment. This requirement fails to recognize that pollution control equipment, unlike most industrial plant and machinery, does not contribute to the revenue producing capacity of the business. And present tax law provides no incentive to industrial polluters to install needed treatment facilities.[44]

Legislation along these lines has received wide support among business and civic groups. The American Municipal Association's National Municipal Policy Statement of Water Resources, urged Congress:

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[44] Congressional Record (daily ed.), December 3, 1963, p. 21976.

> . . . to permit five year depreciation of productive or profit-contributing waste treatment works.[45]

At its annual meeting in 1962, the National Technical Task Committee on Industrial Wastes noted that there was, "a golden opportunity to persuade Congress of the merit of this type of rapid tax amortization" because of the imminence of congressional action on major tax revision. The NTTCIW adopted a resolution endorsing the conclusion of the 1960 National Conference on Water Pollution, which had urged "permitting industry, for corporate income tax purposes, to charge the costs of nonproductive waste water treatment facilities as expense."

Dr. Spencer M. Smith, Jr., Secretary of the Citizens Committee on Natural Resources, believed that a tax write-off bill would be appropriate followed possibly by a "credit operation bill." He stated in testimony before the 1963 Senate hearings:

> I do not want to state that in all instances, that government should attempt to subsidize all private business, big and small, to alleviate any of the burden upon them of providing for some of these waste and sewage-treatment plants.
>
> I feel that if a showing of need can be made, if there is sufficient legislation whereby this need, including the public interest in contiguous areas surrounding the plant, and so forth, maybe the case can be made for alleviation of the problems, not only by small but by middle and sometimes significantly sized business.[46]

James R. Smith, Vice President of the Mississippi Valley Association, testified on behalf of his organization: "We recognize the advantages and urge Congress to enact laws which will provide optional accelerated amortization for tax purposes of the cost of industrial waste treatment and disposal facilities."[47] The Association formally adopted this position in its 1964 platform. Similar endorsement has come from the Water Pollution Control Advisory Board, the Manufacturing Chemists Association, and the National Canners Association. The U. S. Chamber of Commerce in their 1963-1964 Policy Declarations and the National Association of Manufacturers in their 1963 policy statement urge adoption of legislation allowing write-off over a five-year period.

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[45] See 1963 Senate Hearings, op. cit., p. 91.

[46] Ibid., p. 604.

[47] Ibid., p. 187.

Samuel S. Johnson, Chairman of the National Association of Manufacturer's Conservation and Management of Natural Resources Committee, stated his Association's approval of accelerated depreciation "because of the non-revenue producing concept of the facility that is being put in."[48]

The League of Women Voters support of tax incentives is based on the following reasoning:

> If the water is to be cleaned up, industry must do a great part of the job, must carry out much more pollution control and abatement than it is doing at present. This cleanup serves the health and welfare, the safety of the public. It does not increase profits. We think it will be necessary to have some public sharing of abatement costs. A partial sharing of costs could be expected to have a multiplier effect similar to that of the grants-in-aid to municipalities.[49]

The Department of Health, Education, and Welfare has taken no official stand on the proposal on the grounds that this is a tax matter and beyond the competence of the department. However, Secretary Anthony J. Celebrezze made some personal comments based on his experiences as mayor of Cleveland:

> The Republic Steel Co. of the city of Cleveland had converted to the oxygen process. The oxygen process pours out red smoke, which is contrary to our air pollution laws in the city of Cleveland.
>
> We called in the officials, who were very co-operative, and they spent $3 million to put in a precipitating plant, to completely eliminate the pollution.
>
> Now, I think as an inducement they should have been given an accelerated tax write-off.
>
> I don't think they got any tax write-off whatsoever.

Mr. Celebrezze cited too the instance of General Motors, which invested a similar amount in a water treatment facility. Noted the Secretary: "I think we ought to give encouragement to that sort of thing. I would be in favor of giving some kind of an inducement."[50]

In the New England States, interest in incentives led to the creation a decade ago of a committee on state and Federal aid to industries by the New England Interstate Water Pollution Control Commission.

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[48] Ibid., p. 226.

[49] Mrs. C. F. S. Sharpe, Program Secretary (Water Resources), League of Women Voters of the United States, to Howard N. Mantel, November 4, 1963.

[50] 1963 Senate Hearings, op. cit., p. 466.

In its final report, dated January 7, 1955, the committee noted ". . . the large percentage of the industries did not feel that aid of this sort was necessary. There were some indications pointing to the needs from a tax standpoint possibly in the form of accelerated amortization."

In addition, the committee undertook a survey, the results of which were presented at a meeting of the Commission at Barrington, Rhode Island, March 23, 1954. The results of the survey are contained in an appendix to this report.51/

New England, Maine, Massachusetts, New Hampshire and Vermont have enacted legislation to provide tax incentives at the state level, discussed in a later section of this report.

Tax Credit Legislation

A proposal for an increased investment tax credit to encourage construction of pollution treatment facilities by doubling the existing credit nearly became law as part of the Revenue Act of 1964. Some impetus for this had come from the American Municipal Association. Its National Municipal Policy Statement on Water Resources (1962) recommended "Federal income tax credits to reimburse industries for costs of constructing nonproductive waste treatment works installed to eliminate water pollution in accordance with State and/or local law or ordinances."

The most recent proposal was introduced by Senator Ribicoff on the Senate floor on February 7, 1964. It was offered as an amendment to H. R. 8363 (88th Congress), the omnibus tax bill, on behalf of himself and nine other senators.52/

The bill included the following:

Facilities To Control Water or Air Pollution.

> (a) In General.--Section 46(c) (relating to definition of qualified investment for purpose of investment credit in certain depreciable property) is amended by adding after paragraph (4) thereof the following new paragraph:

51/ New England Interstate Water Pollution Control Commission. Report of Committee on State and Federal Aid to Industries (Mimeographed, January 7, 1955).

52/ Senator Hart stated he was the original sponsor of the amendment. The cosponsors were Senators Muskie, McIntyre, Engle, Javits, Keating, Pastore, Bartlett, Saltonstall, and Pell.

"(5) Facilities to control water and air pollution.--

"(A) In the case of section 38 property which consists of facilities or equipment to control water or air pollution the amount of the qualified investment shall be twice the amount determined under paragraph (1).

"(B) For purposes of subparagraph (A), the term 'facilities or equipment to control water pollution' means a facility or equipment used to control water pollution by removing, altering, or disposing of wastes from any type of manufacturing or mining process, including the necessary intercepting sewers, outfall sewers, pumping tower, and other equipment, and their appurtenances.

"(C) [defines air pollution equipment.]"

(b) Effective Date.--The amendment made by subsection (a) shall apply to taxable years beginning after December 31, 1963.

Under the proposed amendment the credit would be increased to 14 percent for purchases of air and water pollution control equipment.

In his Senate presentation, Senator Ribicoff argued:

> We will never have a successful attack on air and water pollution until we recognize the vital role that industry must play in solving this problem. We cannot simply point a finger at industry and say "You must do something to end pollution." We have to recognize realistically that the money industry spends for this equipment produces no profit. These expenditures are made in the public interest, and there is some public responsibility to provide an incentive to purchase this needed equipment.[53]

Ribicoff emphasized that the amendment would not increase profits by creating new loopholes.

Senator Ribicoff admitted that the Treasury Department formerly had opposed this type of amendment, but the Senator pointed out that:

> . . . the Treasury last year recommended to Congress that this tax bill include a provision to allow industry to deduct in the year of purchase all the costs of equipment for research and development. That amendment would have cost $50 million . . . and the tax break would have been

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[53] Congressional Record (daily ed.), February 7, 1964, p. 2288.

> given on profit-making expenditures. I fail to see any logic whatsoever in the Treasury's support of that provision and its opposition to an amendment of this type. Furthermore, as I have said before, Congress has its own responsibilities to decide what provisions it wishes to support. We need not accept as binding the Treasury's disapproval in every instance . . . Now is the time to combine the public attack we have succesfully launched with the vast private effort that must be made.

Most significantly (since no precise figures had been offered before) Ribicoff made this statement on magnitude: "On the basis of Treasury estimates of expenditures for pollution control equipment, the revenue loss of the amendment in the first full year would be $28 million."

Senator Long of Louisiana, a member of the Senate Finance Committee which had considered the bill, explained that:

> ". . . this matter was discussed on a different basis in the committee. At that time the proposal would have had a much greater revenue impact. The committee could not agree to it. We have had an opportunity to examine the amendment of the Senator from Connecticut, as modified, with a much lower revenue estimate involved, and we will be glad to take it to conference and see what the House thinks about the amendment.

It is interesting to note that the $28 million annual revenue cost (first full year), reflecting a credit increase of 7 percent of total investment, implies an annual total investment for depreciable air and water pollution treatment facilities of $400 million.

The Ribicoff amendment was agreed to by the Senate, but was dropped in conference and thus was not enacted in the 1964 omnibus tax law.

Government Loan Programs

Government loan programs serve two purposes: (1) as discussed above, they make funds available at subsidized interest rates, that is, at rates lower than those charged by commercial sources, and (2) they make borrowing easier by providing funds to firms which do not have easy access to banks or other commercial lending sources because their prospects or credit are poor, or for other reasons. Where no cash subsidy is provided, that is, where the interest rate and terms are at least as high as bank loans, the only reason for seeking a government loan is that the government is willing to take a greater risk on repayment than commercial lenders. Thus, only marginal firms are likely to take advantage of such opportunities. The Small Business Administration's loan program--discussed below--demonstrates that there is little interest in this type of loan to finance acquisition of pollution treatment facilities. Moreover, government red tape may deter potential borrowers.

Small Business Loans

Under Section 7(a) of the Small Business Act, the Small Business Administration makes loans up to $350,000. The loans have a 10-year maximum allowable term, with an interest rate of 5½ percent maximum. The SBA interest rate is lowered to 4 percent in Area Redevelopment Administration certified areas, and where there is substantial and persistent unemployment.

According to an SBA spokesman, the interest rate is somewhat lower than small businesses would be able to obtain commercially:

> I would say that normally the interest rate which a small business would pay on equipment financing of any type, not just water pollution, would vary from 6 percent simple to perhaps 8 percent simple.[54]

As we have seen, the attractiveness of a loan depends not only on its interest rate but the term. In any event, extending loans beyond the life of facilities would hardly be justified under any circumstances.

As of 1963 the Small Business Administration had made only two loans to finance air or water pollution treatment equipment. A $50,000 loan was made to the Arapahoe Lodge Company in Colorado, of which $30,000 was to finance a sewage unit. The other loan concerned a facility to control air pollution.

Industry's lack of awareness of the availability of these loans for purposes of financing treatment plants may account for the low popularity of the program. Recently, the Small Business Administration called on its field offices to provide financial assistance "wherever possible to qualified small businesses which are required to install equipment to combat air or water pollution."

In the event a program of government loans to assist industries in financing treatment facilities were initiated, the Department of

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[54] 1963 Senate Hearings, op. cit., p. 525, testimony of C. R. Lanman, Deputy Administrator for Financial Assistance, Small Business Administration, on behalf of SBA Administrator John E. Horne.

Health, Education, and Welfare probably would act as the principal Federal agency approving loan applications. Under legislation proposed by Senator Abraham Ribicoff, discussed below, the Treasury Department also would be involved, since a revolving loan fund would be established in that department. If a co-operative program involving Health, Education, and Welfare, and the Small Business Administration were established, the Treasury could play a less active role. In that case, following a suggestion of SBA Administrator Horne, Health, Education, and Welfare working with the states, would approve the facility to be constructed, while the Small Business Administration would act on fiscal responsibility and actually make the loan.

A disadvantage inherent in any loan program, however, is that the lending agency must exercise responsibility during the term of the loan. Tax concessions, such as accelerated depreciation, tend to be more self-executing and do not entail ongoing administration.

Other Government Loan Programs

Among the major government loan programs are those to stimulate rural electrification. These are made for a 35-year period at a 2 percent rate. Well over $3 billion of such loans are outstanding. This provides the co-operatives involved with a 3 percent interest rate advantage over what they could borrow in the private market. Similar loan programs have been established under the Small Reclamation Projects Act involving an interest rate which provides between ½ and 1½ percent rate advantage over private loans; the college housing program which provides 1½ to 2½ percent rate advantage; and public facilities loans, made mostly to small local governments for water supply, sewerage, and gas supply facilities.

In addition, the Federal government has provided loans (and loan guarantees) to meet certain desperate situations. The Reconstruction Finance Corporation loan program is a good example. Between 1932-1956 it made loans totaling $1,143 million to railroads for temporary financing (in the first instance) and later for assistance in reorganization, capital improvements, refinancing, and finally capital requirements required by the preparedness program immediately prior to World War II. The recovery of these loans was slower in many cases than would have been in the case of private loans (although the Federal government's costs were more or less covered by interest receipts from the loans).

The Federal government has also embarked on loan programs because of situations it helped to create, including uncertainties regarding long range Federal policy which made difficult the prospects for obtaining private credit. Examples include loans and loan guarantees to expand defense production facilities (and for working capital for defense producers) during World War II and the Korean War, made by RFC and under the Defense Production Act and the Federal Reserve V-Loan program. Loans and loan guarantees to feeder airlines, helicopter lines, and shipping companies, to finance new equipment, also fall into this class, since all these are operations which depend heavily on Federal operating subsidies.

RFC also made loans during the depression of the nineteen thirties, to stimulate economic activity. Sizeable loans have been made for local transportation improvement, including financing of the San Francisco Bay Bidge and the Pennsylvania Turnpike, and a $29 million loan to Cleveland for transit facilities. A loan program under the 1961 mass transportation act has not, however, proved of major significance in assisting public agencies to finance needed additions to public mass transit facilities; the current emphasis in legislation pending before the House of Representatives is on grants, although the loan program would be continued.

Use of Federal credit has also helped stimulate the nation's housing boom. Outstanding examples are the FHA and VA mortgage insurance and guarantee programs, and the FNMA mortgage purchase programs. These programs, by guaranteeing against loss, imposing construction standards, and standardizing terms, have attracted enormous volumes of funds into the mortgage market, in part from investors who have bought mortgages, and have made the insured and guaranteed mortgage a national capital market institution. Special programs for the elderly, military personnel, etc., have opened new doors to national capital markets for especially risky types of housing obligations. Federal loans for college housing in the magnitude of $400 million has stimulated $75 million of private participation in the same bond issues.[55] The loan program of the Area Redevelopment Administration is discussed in Chapter VIII.

In light of this extensive history of government loan programs, we turn next to a discussion of legislation and comments on Senator Ribicoff's proposal for low cost loans for pollution abatement.

Legislation to Provide Low Cost Loans

Legislation to authorize government loans to industry for financing treatment facilities has been proposed for over a quarter of a century. In 1937 Congress approved legislation (vetoed by President Roosevelt) which provided for both loans and grants. The bill, H. R. 2711 (75th Congress, 1st Session), provided, inter alia:

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[55] See, in connection with this discussion, a report by the Institute of Public Administration. Urban Transportation and Public Policy (New York: 1961), ch. VI. This report to the Housing and Home Finance Agency and the Department of Commerce is being published in revised form by the Chandler Publishing Co. this year.

> Sec. 6. Any person discharging untreated or inadequately treated sewage or waste in character or quantity sufficient to be deleterious to the navigable waters of the United States or streams tributary thereto is hereby dcelared to be eligible for Federal aid in the form of grants-in-aid or loans for the construction of necessary treatment works in accordance with plans approved by the respective State health authority and the Surgeon General. Such grants-in-aid or loans shall be made upon such terms and conditions as the Secretary of the Treasury with the approval of the President may prescribe, subject to the following limitations: Grants-in-aid or loans shall be made only upon the certification of the State health authority having jurisdiction and upon approval and recommendation of the Surgeon General.[56]

Bills on this subject have been introduced annually in Congress in recent years. Under these bills the terms of the loans were limited to 10-year periods, with interest either prescribed by the Congress or the President or set at specific annual percentages, the highest being 5 percent. One proposal, calling for unusually low-interest bearing loans, is described as follows:

> In the 80th Congress, S. 418, sponsored by Senators Barkley and Taft and subsequently enacted as Public Law 845, the Water Pollution Control Act, included provisions for making loans, not to exceed one-third of the estimated reasonable cost of a project, to bear interest at 2 percent annually, and not to exceed a ten-year period. These provisions were stricken from the Senate-passed bill by the House Committee on Public Works, which instead authorized making available $1 million annually for five years for allotment to the State and interstate water pollution control agencies for the conduct of investigations, research, surveys, and studies related to the prevention and control of water pollution caused by industrial wastes.[57]

The most current low cost loan proposal is S. 737, 88th Congress, introduced by Senator Abraham Ribicoff, for himself and 16 other Senators.[58] The bill would authorize the establishment in the Treasury of a water and air pollution revolving loan fund for the purpose of making loans to small business concerns for the acquisition, installation, or construction of treatment works necessary to abate or control water or air pollution caused by such concerns.

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[56] The bill passed the Senate August 16, 1937 and the House of Representatives on August 18.

[57] Thaddeus Rajda. "Proposals for Federal Aid to Industries for Waste Treatment" (mimeo), p. 1.

[58] Senators Bible, Cannon, Dodd, Hart, Humphrey, Inouye, Kuchel, Long (Missouri), Magnuson, McGee, Randolph, Williams (N.J.), Young (Ohio), Muskie, McIntyre, Pell.

The bill authorizes the Secretary of Health, Education, and Welfare to make loans to small businesses as defined under Section 3 of the Small Business Act (15 U.S.C. Section 632). Loans are authorized to be made under the following conditions:

1. Loans are to be made to finance treatment works which have been certified by a state water pollution control agency and by the Secretary of Health, Education, and Welfare as conforming to Federal programs in water and air pollution.

2. The amount of the loan is not to exceed the cost of the treatment works. Moreover, the applicant must show that he is unable to secure equally favorable loans from other sources.

3. The loan is to be repaid within a 10-year period.

4. The loan is to bear interest at not more than 2-3/4 percentum per annum or "the total of $\frac{1}{4}$ of 1 percentum above the average annual interest rate on all interest bearing obligations of the United States forming a part of the public debt as computed at the end of the preceding fiscal year, adjusted to the nearest 1/8 of 1 percentum.

Hearings were held on the bill during 1963 by a Senate Public Work's subcommittee on air and water pollution headed by Senator Muskie of Maine, but it was not enacted by the 88th Congress.

At the 1963 hearings by the Senate subcommittee on pollution, John I. Taylor, representing the American Farm Bureau Federation, voiced no objection to S. 737 except to Section 4--the revolving fund in the Treasury. He stated the Federation's view that the money received for interest and repayment of loans should go into the Treasury and be reappropriated annually.[59]

Jack T. Garrett, testifying for the Manufacturing Chemists Association, expressed approval of S. 737 stating that there are many small companies ". . . where a large proportion of their invested capital which would be necessary for pollution control can cause a great deal of economic harm to the country. As a matter of fact, it could actually bankrupt them, and if Federal funds at small interest rates were available, it could in many cases bail these small companies out of difficulty and consequently keep them from having to shut down."[60]

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[59] 1963 Senate Hearings, op. cit., p. 410.

Representatives of conservation interests, including the Isaac Walton League of America and the National Wildlife Federation, supported the Ribicoff bill.[61]

Spencer M. Smith, Jr., secretary, Citizens Committee on Natural Resources, felt that the bill provided a reasonable approach to the problem of economic hardship where there is strict enforcement of pollution control. Smith discussed findings of a study conducted by him regarding small business research development firms within the Washington metropolitan area. He found that these firms are harassed by two persistent problems, one, the difficulty under the existing tax laws to retain sufficient capital for needed growth, and, two, the difficulty of obtaining capital or monies by entrance into the capital market or from banking houses. Smith noted:

> . . . a firm which has been small but successful in any state of growth, could be brought to dissolution if the financial requirements of a sewage treatment plant were significant in its overall operation. Since the economy as well as the public certainly needs sustained growth of small business enterprises, it would hardly be in the public interest to simply dismiss them as a casualty involved in the cleanup period. No one is suggesting that the cleanup not take place because it appears to us that this should be primary in our goals. It does appear, however, that in conditions such as those just described, that the economic plight could be eased by a loan program as indicated in S. 737.
>
> In all probability this might also hasten abatement programs. There will be few enforcement officers irrespective of what specific bureau they represent that will move as quickly against a small firm as perhaps they should. Therefore, effecting loans and providing a method by which these firms can solve their pollution problems may very well facilitate rather than hinder any abatement involved.[62]

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[60] Ibid., p. 405.

[61] See Ibid., 156.

[62] Ibid., p. 592. The study referred to was prepared under the auspices of the University of Maryland.

These endorsements notwithstanding, Administration backing did not materialize. The closest support came from Secretary Celebrezze. He noted that "Industrial wastes and the adequacy of their treatment comprise a major consideration in achieving the aim and purposes of . . . [the Department's pollution control] programs. We, therefore, recognize the need to encourage and stimulate industry's co-operation and participation in this regard." However, he deferred comments on the bill to other agencies of the executive branch on the grounds that, "Consideration of any interest rate such as proposed in this bill would need to include the relationship of such action to the national fiscal policy."63/

G. d'Andelot Belin, General Counsel of the Treasury, presented his Department's opposition to the bill, He felt that the interest rate on direct federal loans ". . . should generally cover the cost of borrowing to the Treasury, plus an allowance for administrative expenses and probable losses." He noted that the ". . . interest rate arrived at under . . . [the Ribicoff bill] would be influenced by the rate on short-term Treasury borrowing and borrowing over many years in the past, including the artificially low rates during World War II. To the extent that this average coupon rate is lower than the rate reflecting current market yields on outstanding Treasury issues with remaining periods to maturity comparable to the maturities of the proposed loans, a Federal interest rate subsidy is involved."

Belin stated further that "To authorize Federal loans at subsidy interest rates where equally favorable terms cannot be obtained from private sources would mean that substantially all the loans would be made by the Federal government." Federal assistance should be given not to assure a reasonable rate of interest but because of the ". . . unavailability of private long-term capital for such unprofitable projects as treatment works . . . such assistance should be given at non-subsidy rates under the regular loan program of the Small Business administration."64/

Belin noted that the Treasury Department had no independent knowledge of the need for a Federal interest rate subsidy program to finance the construction of treatment works by small business concerns to abate water or air pollution works.

63/ Anthony J. Celebrezze to Hon. Pat McNamara, Chairman, Senate Public Works Committee, June 15, 1963, quoted, Ibid., pp. 16-17. See also the Secretary's testimony at page 461.

64/ G. d'Andelot Belin to Senator McNamara, June 14, 1963, quoted, Ibid., p. 18.

Additional arguments in opposition were voiced by the Bureau of the Budget, which recognized the necessity to encourage industry action to control and to abate pollution. However, the Bureau saw serious questions about the necessity for the loan program--substitution of public for private credit, the interest formula, and the inadequate coverage of costs by the revolving fund. Phillip S. Hughes, assistant Bureau director for legislative reference, stated:

> In all these respects, moreover, the bill appears inconsistent with the recently issued recommendations of the Committee on Federal Credit Program, which the President had endorsed as guidelines for all Federal departments and agencies "especially in proposing any new or expanded credit authority."

Hughes also felt that the lower interest rate in the Ribicoff bill in contrast to the interest rate under the SBA program ". . . would not be sufficient to induce any significant number of small businesses to construct treatment facilities which would not otherwise be willing and able to do so if they had to rely on other sources of financing. . ." He emphasized the Administration's reliance on private credit and noted that the bill would substitute public credit to a wholly unnecessary extent. He joined Belin in the belief that a subsidy was involved, since the interest rate was not based exclusively on current borrowing costs.65/

An alternative approach to the Ribicoff proposal was offered by John E. Horne, Administrator, Small Business Administration:

> Recognizing the interest of HEW in the subject matter as underlined by this bill, and the importance of the objective of the bill, I believe that mutually satisfactory arrangements can be developed under which HEW would make determinations relating to the needs of the facility, in

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65/ Phillip S. Hughes to Senator McNamara, June 13, 1963, quoted, Ibid., pp. 18-19. See also a similar letter from Joseph Campbell, Controller General of the United States (dated May 28, 1963), who felt the interest rate should be set at 2-3/4 percent rather than giving the Secretary any leeway; the alternative interest rate should be made to read: "the total of one-fourth of 1 percentum per annum above the current average market yields on outstanding marketable obligations of the United States having comparable maturities as of the last day of the preceding month and adjusted to the nearest one-eighth of 1 percentum." Quoted, Ibid., p. 17.

compliance with Federal and State standards, etc., at the same time utilizing SBA's competence in the field of lending.[66]

Given the Administration's opposition and the existence of the SBA loan program, no action was taken on the bill in 1963 or 1964.

Loan Guarantees

Federal insuring of private loans made to finance treatment facilities has considerable appeal in avoiding several major objections to direct Federal loans: Public credit is involved only in limited situations; there is no competition with private lending sources; government subsidies are not involved except in cases of default. The guarantee principle has a primary aim: to assure the availability of private credit by minimizing the risks to the lender. With pledge of the resources of the United States Treasury in the event of default by a borrower, interest rates are likely to be lowered so as to provide some savings to the borrower over normal interest rates.

Federal guarantee of loans for this purpose has not been formally proposed in legislation and has received little attention among interested groups. However, a similar program has been under way in recent years in the transportation field.

The program was originally authorized as part of the Transportation Act of 1958 for the purpose of keeping the railroads running. That law, enacted to offset the critical financial situation posed by deficit-bearing passenger railroad service, authorized $500 million in loans guaranteed by the Interstate Commerce Commission.

To the borrower, a subsidy is provided if the loan guarantee lowers his interest costs. To the government costs largely are (a) administrative, and (b) risk insurance. If reasonably tight credit procedures are maintained, the loss premium costs will be minimized. In the case of the ICC loan guarantee program, the only defaults were on loans made to the New Haven Railroad which involved a unique financial and political situation.

Loan guarantees involve the government primarily in a facilitative role, although as noted administrative costs and risk premiums imply some revenue loss. However, from the viewpoint of the borrower, the financial stimulant is low; it will appeal to the marginal firm more than to a firm in a good financial situation.

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[66] John E. Horne to Senator McNamara, June 17, 1963, quoted in 1963 Senate Hearings, op. cit., p. 20.

Grants

No formal proposal for a grant program to private industry to assist in acquiring pollution treatment facilities has been made since 1937. Nevertheless, grants could provide a high level of financial assistance, depending on the magnitudes involved and the degree or percentage of support.

Grants to individuals or less frequently to corporations in the past have been made to fulfill national, state, or local objectives.[67] Welfare payments are designed to aid those in dire economic straits. Scholarships may assist the gifted in their pursuit of knowledge. Parity payments to farmers are made to support national agriculture policy, among other factors.

The airline industry has received grants (often disguised as mail contracts) to encourage the growth of this relatively young industry. In the maritime industry ship subsidies are made because in the event of war they will be used as means of troop and materiel transport. Some private commuter railroads have received local and state aid. New Jersey has a contract arrangement under which the state provides about $7 million annually to the commuter lines serving the Philadelphia and Newark-Manhattan centers. These are subsidies made in the form of service contracts. A similar approach has been used by Philadelphia's Passenger Service Improvement Corporation (a public corporation of the city) and by the Southeastern Pennsylvania Transportation Compact (an interagency metropolitan corporation utilizing county, city and Federal funds).

Grant programs might operate in one of the following ways or through a combination of methods.

1. Federal demonstration project grants could be authorized to support experimental and prototype treatment facilities. These funds would be used to show what can be done in devising new and highly efficient and economical treatment systems. The Federal government in effect would pay to offset the risk involved to the firm concerned.

2. Grants may be used to offset unusually high pollution treatment costs. These grants would not be awarded across-the-board; instead they would pay for the incremental costs above national costs for treatment of pollution. The scheme involves, of course, the very difficult problem of measuring costs of pollution control, industry to industry, and nationally.

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[67] See U. S. Advisory Commission on Intergovernmental Relations. Periodic Congressional Reassessment of Federal Grants-in-Aid to State and Local Governments (June, 1961).

3. Grants could be made available to support all or part of the costs of construction and/or operation and maintenance of industrial pollution treatment facilities across-the-board. (Alternatively, support could be given to cover debt service obligations.) The actual percent contribution by the Federal government might be left to administrative discretion, assuming Congress approves the basic program and provides contract authority on a direct appropriation. Under this arrangement, assistance would be prorated among the approved applicants. If, for instance, $50 million were appropriated, and approved applications for assistance involving total expenditures of $500 million, the Federal government could not contribute on the average more than 10 percent of the cost.

The program could be organized wholly through the Federal government, grants being awarded directly to industrial firms upon application of the firms directly. Alternatively Federal appropriations could be allocated to the states which would award the funds. This might have particular appeal if the states were contributing to the subsidy.

Finally, the new grant program could be made an integral part of HEW's existing program of grants for construction of public treatment facilities. Municipal governments (and others presently eligible to receive these grants) might be provided with authorized additional funds either for (a) provision of added capacity of municipal treatment plants to handle industrial wastes, (b) construction of sewers and interceptors to existing industrial sites or to new sites for industrial development, or (c) making of grants to industry for construction of private treatment facilities. In effect, this could further the purposes of the proposed 10 percent bonus in pending congressional legislation to municipal treatment facilities programs for conforming to metropolitan or regional plans.

A local agency of government, or a metropolitan or regional body, could be given discretion to utilize Federal funds in a manner most likely to provide a comprehensive solution to metropolitan growth and pollution problems. In effect, this approach follows suggestions occasionally made that Federal grants-in-aid funds, now distributed through a host of agencies for diverse public functions such as welfare, housing, planning, mass transportation, airports, etc., be pooled; that the total available sum be awarded to an established and viable regional agency (say, for the sake of discussion, the Municipality of Metropolitan Seattle). Such a metropolitan entity could have a considerable range of authority in distributing the funds to special districts, local governments, and public authorities, in accordance with an approved general plan for metropolitan development. This system entails far more than pollution abatement program design, but channeling grants through HEW's current program could be a step in that direction. It simply would provide additional funds for water pollution treatment facilities to responsible local or regional agencies, permitting them a certain amount of discretion in their distribution. Thus, funds could be used for public or private treatment facilities, allowing for consideration of the particularly local aspects of the pollution problem and determination of optimum solutions locally. Naturally, the range of discretion of the local or regional agency would have to be carefully defined to preclude abuse.

A proposal for grants, more than other forms of assistance, is likely to stir up a hornet's nest of political opposition. The notion of public support of private enterprise through direct cash subsidy, even to achieve an important national purpose, goes against the grain of widespread political philosophy. Whether industry itself would be willing to support a program of direct grants is doubtful, although most industry associations have supported such tax incentives as accelerated depreciation, which involves subsidy. Whether a desire on the part of the public for timely solutions to the pollution problem can offset the opposition, will depend in part on how acutely and broadly the public perceives the problem, and opinions as to the effectiveness of alternative measures such as accelerated depreciation.

Chapter VII

STATE AND LOCAL INCENTIVES

This chapter is concerned principally with incentives through the tax systems of the states and local governments.

Property Tax Exemptions

The largest source of local revenue is the property tax, which accounts for 87.7 percent of local tax revenues. In 1961, property tax collections were $18 billion, of which $17 billion went to local governments and $0.6 billion, or 3.5 percent, went to the state governments.[68]

Eight states provide exemption from property taxes for property acquired by firms for purposes of air or water pollution abatement. The advantage to industry appears to be small, since the property tax rate, after allowing for deductability of local property taxes from Federal (and often state) taxable income, is infrequently more than 2 percent and is usually much less. In some states, notably New York and Pennsylvania, the property tax applies only to real estate (land, buildings, and equipment permanently attached to buildings).

Let us say a firm invests $100,000 in pollution treatment equipment in a plant located in New York or Pennsylvania. Half of this is in land and buildings and the rest is in machinery not subject to the property tax. Let us assume further that the property tax rate is 1½ percent (a reasonably high figure). The firm is thereby being relieved, after allowing for Federal and state income tax deductability, of $750 a year taxes for a period of, say, 20 years. The present value of $750 a year for 20 years, at a 6 percent discount rate, is about $8,300. That is, a firm would recover $8,300 out of the $100,000 investment by virtue of property tax exemption. In states where the tax applies to personalty, such as equipment not permanently attached to buildings, the value of the exemption may be somewhat higher.

Moreover, the exemption is an expensive device for the municipality. This stems from the fact that property taxes may be deducted as an expense in computing the firm's Federal income tax. Thus, for every dollar that a municipality provides through exemption, the firm benefits only 50 cents. The other 50 cents is already saved in deduction from the Federal income taxes for firms in the 50 percent bracket.

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[68] U. S. Advisory Commission on Intergovernmental Relations. The Role of the States in Strengthening the Property Tax, vol. 1 (Washington: GPO, 1963), p. 67.

Other factors should also be considered, such as the equities involved in taxing property which does not add directly to the profitableness of the firm as well as the already existing erosion of the tax base because of sporadic exemptions.

One can question the logic of imposing property tax on facilities which are not truly a source of income for a profit-seeking business. The property added does not increase local government costs (as would be the case, say, where a parking lot is constructed increasing the need for increased traffic enforcement). In some cases costs of pollution control to local governments will be reduced, and there might be considerable community benefits if the costs of drinking water purification are substantially lowered.

There are two ways of looking at the equities involved. On the one hand a nonprofit-producing facility is built under actual or potential threat of government sanction. Is it fair to impose a tax on such facility?

On the other hand, it may be argued that many parts of a company's property are not directly related to making a profit, such as employee lounges and cafeterias, safety equipment, lawns and landscaping, and the like. Yet these facilities are part of the taxable property of the company. They add to the company's image and community standing, its relations with labor, and its ability to meet standards of safety, pollution control, and the like, all of which contribute to its income-earning capacity in the long run.

One of the greatest objections to authorizing property tax exemption for this purpose is the great erosion which has already taken place through exemptions for other purposes and the consequent harm to the property tax base.

There is little uniformity among the states in defining taxable property. A study of the property tax for the U. S. Advisory Commission on Intergovernmental Relations contains this telling statement:

> Since each State has had the responsibility for coping with its own property tax problems, the modifications and changes that have been made have followed no uniform national pattern . . . The States have engaged in numerous gradations of erosion of the general property tax; some have classified property within the general property tax structure to permit taxation of several classes at varying relations to value; others have withdrawn certain classes of property from the general base for special ad valorem taxation. No two States are in full agreement as to what the tax base should be, and the four states which have narrowed the

base to real property--Delaware, Hawaii, New York and Pennsylvania--differ as to what this class includes.[69]

In addition, exemption of certain classes of property has been an unceasing occupation of interest groups. The clamor for tax exemption has been likened to a contagious disease: "One specific exemption in itself may appear quite harmless. However, going back to the turn of the century, one exemption leads to another until today, including intangibles, more property has been taken from the tax base than now remains."[70]

The report by the Advisory Commission found it was impossible to determine the magnitude of tax exemption. It noted, however, "As compared with an estimated national wealth of $1,682.1 billion in 1958 (a figure that does not include intangibles), the aggregate of locally taxable assessed valuation was $355.7 billion in 1961 (inclusive of intangibles). Because of fractional assessments, the contrast is less extreme than these figures appear to indicate, but still great." The Advisory Commission report proposed curtailing or abolishing some exempt classes, including:

> (1) exemptions that foster inequity and special privilege; (2) exemptions which are veiled subsidies to private interests that would be difficult to justify as frank State budget appropriations; (3) exemptions which are ill-chosen and defective methods of granting subsidies and awards and recognizing needs that may in themselves have been justifiable; (4) exemptions which unnecessarily and needlessly complicate the tax system and add to the difficulty and expense of its administration.[71]

Based on the experience in the states which have property tax exemption statutes as an incentive to acquire pollution treatment equipment, no insurmountable administrative problem is posed. The basic authority will be state enabling legislation. A requirement for certification from the state's pollution control agency should be a part of the enabling legislation to insure that the exempted facilities are in fact satisfactorily constructed and operated. Consideration should also be given to providing some voice to the local governments whose tax revenues are affected. The procedure adopted from Ohio's air pollution exemption program, discussed below, illustrates this approach.

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[69] Ibid., p. 30.

[70] Quoted Ibid., p. 76. The statement appears originally in League of Women of Wisconsin Municipalities. Readings on the Wisconsin Assessment Process, vol. 1 (1961), p. 4.

[71] Ibid., p. 78. See also James R. Rinehart. "Rates of Return on Municipal Subsidies to Industry," Southern Economic Journal, XXIX (April 1963), p. 297 et seq. and John E. Moes. Local Subsidies for Industry (Chapel Hill: University of North Carolina Press, 1962).

State Experience With Respect to Property Tax Exemption

1. Massachusetts. Massachusetts' legislation on this subject adds the following to a list of property which ". . . shall be exempt from taxation":

> Thirty-ninth, Any equipment, facility or device installed on or attached to real property for the purpose of abating or preventing pollution of the atmosphere or pollution of any stream, pond, lake, tidal water or flats within the commonwealth.[72]

It is extremely difficult to assess the impact of this law, both as to revenue cost or incentive value. First, the State Health Department had little information on the application of the law since the exemption is entirely a fiscal matter and does not require action by the Health Department or its sanitary engineers and pollution control experts. Second, the exemption is the 39th in the list of exempt property. It is applied automatically by the local assessors and no record exists of how much property in fact is exempted.

2. Vermont. Vermont exempts from property tax any real and personal property exclusively installed and operated for the abatement of pollution of waters within the State or within the purview of the New England Interstate Water Pollution Control Compact in accordance with engineering principles approved by the Vermont Water Resources Board. Exemption for this property continues as long as its operation meets with the approval of the Vermont Water Resources Board.[73]

3. New Hampshire. This state follows a similar approach. Its law--enacted in 1955--includes the following provision:

> In view of the general public benefits resulting from the control of pollution in the surface waters or air of the state and to further promote the purposes and objectives of this chapter, any treatment facility, device, appliance or installation (whether consisting of real or personal proper-

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[72] Massachusetts Acts of 1961, Chap. 539, Approved May 26, 1961.

[73] Vermont Laws of 1961, H. Bill 148.

> ty or a combination of both) built, constructed or placed in operation by any person, firm or corporation in this state wholly or partly for the purpose of reducing, controlling or eliminating any source of pollution shall be exempt from taxes . . . for a period of twenty-five years for that percentage of the valuation effective in the control of water or air pollution as the commission shall determine. Upon such determination the commission shall notify the municipality of the percentage determined by it to be subject to exemption from taxes, and the taxing officials shall thereafter reduce the assessment by a like amount.
>
> 5-b Review. The commission may annually conduct a hearing to determine the percentage of such facility which is effective in controlling pollution, and either the municipality or the owner of the control facility may request a rehearing or appeal from such determination. . .74/

In practice a hearing is held only in connection with the original application for tax relief. The rationale for the legislation is explained by William A. Healy of New Hampshire's Water Pollution Commission:

> The twenty-five year feature was included for the reason that this might represent the useful life of the facility and that at the end of such period a new installation or substantial remodeling would be necessary. Thus, industry would then be in a position to request tax exemption on the new installation. No concern was expressed at the time of passage of this legislation concerning a loss in revenue by local communities. It was reasoned that the waste treatment plant would not have been installed except for the pollution control program. Hence, in the ordinary course of events the community would not have enjoyed any tax revenue from this source. The position was also taken that industry in making such a nonproductive investment, was doing so in the interest of the public welfare and, therefore, entitled to some form of recompense.75/

4. Maine. The state of Maine exempts from property taxation "industrial disposal systems that produce no by-products which are marketed or used in the process of production." According to the chief engineer of Maine's Water Improvement Commission:

74/ New Hampshire Laws of 1955, Chap. 196 (Contained in Chap. 149 RSA).

75/ William A. Healy, Technical Secretary, New Hampshire Water Pollution Commission to Howard N. Mantel, December 26, 1963.

> This statute was enacted through efforts of legislators who believed that otherwise industry would shy away from this sort of construction. To the best of our knowledge there has not been a serious contest of this matter and we have not heard of any instance where revenue was lost to municipal governments. At the time of passage of the act there were few plants in existence which would have been eligible and perhaps the reason for the no-contest situation was due to already favorable tax situations. Some major construction in this field has taken place since the passage of the act, but I am sure not because of it because most were new plants, and in the cases no attempt was made to assess to the best of my knowledge. Since the statute reads "no by-products" etc., it is relatively simple to determine whether or not property is eligible. Relief from injustice with respect to taxation of this sort would be through the courts. There is no state reviewing agency named . . .[76]

5. Ohio (air pollution). Under the Ohio law providing a tax exemption for air pollution facilities, the certification is made by the tax commissioner who must make a finding "that the proposed facility was designed primarily for the control of pollution of the air . . . and is suitable and reasonably adequate for such purpose and is intended for such purpose."[77] The pollution control authorities have no direct control over the procedure. An interesting feature of the Ohio law is that prior to issuing the certificate, the tax commissioner must afford both the applicant and the county auditor opportunity for a hearing. The law exempts the property from real and personal property taxation, the franchise tax, sales tax, or use tax. According to a reliable source:

> . . . the deletion of the water pollution control provisions occurred in the Senate based on the objections of local governments, especially school districts, to possible revenue losses beyond those occurring under the air pollution control tax exemption provisions of the bill.[78]

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[76] R. W. Macdonald, Chief Engineer, Maine Water Improvement Commission to Howard N. Mantel, December 30, 1963.

[77] Ohio Rev. Code sec. 5709.21. The new law was enacted by the 105th General Assembly, Amended House Bill No. 26 (effective October 14, 1963).

[78] Alvin K. Peterjohn, Legislative Auditor, Ohio Legislative Service Commission to Howard N. Mantel, January 21, 1964.

6. Oregon. The 1963 legislative session considered but did not enact legislation providing tax exemption of air and water pollution treatment facilities. Under the proposed law application for exemption would be made to the State Tax Commission. "The commission may make such investigation as it deems necessary, including consultation with the State Sanitary Authority . . . The commission may, but shall not be required to grant a hearing respecting such application." Orders made granting exemption or denying the same are subject to judicial review.[79]

According to information furnished by the state health officer the bill was introduced to give financial assistance to one of the larger industrial plants which was faced with a complex air pollution control problem. The bill was tabled because of failure of proponents to be present when the bill was scheduled for hearings on April 10, 1963 and did not become law. The state health officer reports:

> As far as we can learn, Oregon industry has not put forth much effort in support of this type of legislation. It would seem to us that in view of the financial assistance that has been given our municipalities through the Federal water pollution control program, and more recently under the Accelerated Public Works Act, it is only proper that some type of incentive be provided to facilitate and encourage industrial waste treatment facilities. We would hope, therefore, that the special tax legislation which is presently before Congress will receive favorable consideration.[80]

7. Idaho. Idaho's 1963 law providing tax exemption excludes facilities which have value as the specific source of marketable by-products. The law does not provide for certification by the Idaho Department of Health but the state administrator of health writes that it is assumed that "if a claim for exemption is ever made to the Tax Commission, then we will be asked for our opinion as to the validity of the claim." No claim for tax exemption has been made in the relatively short time since enactment.

According to the health administrator the legislation was adopted during the 1963 legislature at the request of the Idaho Processors' organization:

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[79] Oregon, 52nd Legislative Assembly--Regular Session. Senate Bill 416.

[80] Richard H. Wilcox, M.D., State Health Officer, Oregon State Board of Health to Howard N. Mantel, January 3, 1964.

> The potato processing industry in this State literally sprang up overnight and in a very short time attained rather tremendous proportions. We used to send most of our potatoes out of the State as the famous Idaho baker. Now, more than half of our potatoes go out of the State in processed form. These potatoes are all grown in the valley of the Snake River so the processing plants were also placed along this river and this has caused us some headaches in water pollution. We had to ask the potato processors to provide some rather expensive facilities to get the pollution of the Snake River under control. Early in the game they formed an organization of their own members in order to pool efforts in studying waste treatment measures. I believe it was this group then that originally came up with the idea of tax benefit for waste treatment facilities.[81]

8. Wisconsin. Wisconsin's pioneering law, enacted in 1953, provides that all equipment installed to abate or eliminate water or air pollution is exempt from local taxation for five years, unless new income is thereby produced.[82]

9. North Carolina. This state exempts industrial waste treatment and water pollution abatement plants and equipment from ad valorem property taxation (as well as providing a five-year amortization allowance for income tax purposes in lieu of depreciation).[83] The property tax exemption scheme requires certification by the State Stream Sanitation Committee, "certifying that said committee has found as a fact that the waste treatment plant or pollution abatement equipment purchased or constructed and installed . . . has actually been constructed and installed and that such plant or equipment complies with the requirements of said committee with respect to such plants or equipment, that such plant or equipment is being effectively operated in accordance with the terms and conditions set forth . . . by the State Stream Sanitation Committee, and that the primary purpose thereof is to reduce water pollution resulting from the discharge of sewage and waste and not merely incidental to other purposes and functions." The Committee's director of stream sanitation and hydrology reports:

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[81] Terrell O. Carver, M.D., Administrator of Health, Idaho Department of Health, to Howard N. Mantel, January 17, 1964.

[82] Wisconsin Laws of 1953, Chap. 183; 648.

[83] The text of the laws is set forth in North Carolina Laws of 1955, Chap. 1100.

> The act was initiated by the State Stream Sanitation Committee and, of course, was supported by industry, in general. It was intended and has served as an incentive to encourage industry to provide adequate waste treatment facilities. Most industrial concerns which have constructed pollution abatement works since its enactment have utilized the tax advantages of the Statute; however, we do not have figures to indicate the actual tax loss which resulted . . . we believe that the provisions of Chapter 1100 have proven beneficial to our program as well as to our industries which have and are having to provide costly waste treatment works. Furthermore, it occurs to us that the presently proposed Federal legislation of a similar nature [Ribicoff's accelerated depreciation bill] would also prove beneficial and would recognize the problem of industry in this area of activity somewhat as Federal Grants for sewage treatment works construction recognizes the financial burden of municipalities in providing pollution abatement facilities. We have and will continue to support the passage of similar legislation by the Congress.[84]

Since enactment of the North Carolina statute in 1955, approximately 20 tax certificates have been issued. This includes property tax benefits and rapid amortization. While it is difficult to obtain revenue loss figures, because both state and local units of government are involved, the overall impact--in terms of use, stimulation, and revenue loss, seems to be relatively low.

The experiences of two firms in North Carolina may be used to illustrate the effectiveness of the exemption program.

a. Royal Cotton Mill Company. This company's treatment plant serves the domestic-type wastes in a cotton mill employing 215 people. The treatment plant has an estimated volume of 5,400 gallons per day being processed. No dyeing or finishing is involved so that no process waste is discharged from the waste disposal unit. The plant actually has a 7,500 gallon per day capacity since it was designed with expansion in mind. The total cost of the unit was approximately $15,000.[85] The annual tax benefit amounted to approximately $220.

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[84] E. C. Hubbard, Director, Division of Stream Sanitation and Hydrology, North Carolina State Stream Sanitation Committee, to Howard N. Mantel, December 23, 1963.

[85] Information furnished by Alton B. Smith, Vice President, Royal Cotton Mill Company, Wake Forest, North Carolina

b. Champion Papers. In 1958 Champion installed stream pollution control facilities at its Canton, North Carolina plant. Facilities included settling ponds, together with a screening and clarifying system and the appropriate collection and discharge facilities. Additions were made in 1962 consisting of a clarifying and oxidation system, together with bark collecting and screening facilities. Total cost of improvements was $1.4 million. It was unnecessary to arrange special financing for these projects. "Tax benefit obtained under Chapter 1100 is minimal. We avail ourselves only of the credit against the franchise tax base and this results in a saving of less than $500 per year. It is, therefore, safe to say that the law was not an incentive to construct these facilities."[86]

Rebate on Oil Severance Tax

Arkansas provides a tax incentive to meet a specific pollution problem--that of salt water pollution as an incident of oil drilling operations. The Arkansas law provides that the severance taxes due on oil produced by wells connected to a subsurface salt water injection system will be credited against the monthly capital costs (amortized over a five to ten year period) of the system plus the monthly operating costs up to 100 percent of the tax due. If the tax due exceeds the capital plus operating cost, the balance, of course, is payable.[87]

Under an amendment to the original act the state has set overall limits on the amount of severance tax credit allowed annually under the act. This ranges from $105,000 in 1959 to $370,000 in 1963 and each calendar year thereafter. The statute provides:

> If, during any calendar year, the total severance tax credits of all oil producers operating approved underground salt water disposal systems exceed the total maximum allowable severance tax credits mentioned above, the Commissioner of Revenues shall prorate the allowable credits among the respective oil producers in proportion that credits due each producer bears to the total of all severance tax credits due all oil producers.

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[86] Information furnished by Norman D. Coombs, Tax Manager, Champion Papers, Inc., Knightsbridge, Hamilton, Ohio.

[87] Arkansas Acts 57 of 1959 (H. Bill 102), as amended. The law applies also to natural gas producers, Act 138 of 1961 (H. Bill 183).

This provision, of course, takes the guesswork out of the program with respect to cost to the state. (A similar approach might be used in connection with property tax exemption or even at the Federal level, a special investment tax credit.)

The background and experience under the Arkansas severance tax credit program is explained in information furnished by the director of Arkansas' Water Pollution Control Commission:

> The Commission's lower Ouachita River basin survey revealed that about 3,000 producing oil wells were discharging large quantities of salt water to the surface of ground and this eventually reached the river. The Ouachita flows into Louisiana where it is utilized for water supply in addition to its uses in Arkansas. The Commission issued Order 1-58 in December 1958 requiring a 20 percent per year reduction in the volume of salt water discharged to the subject drainage area.
>
> Since many of the wells in this area were in the "stripper" category (producing about 100 barrels of salt water or more per barrel of oil) it was apparent that the cost of constructing injection systems could not be borne by the smaller operators and the resulting abandonment of many of these wells would in turn affect the refineries dependent upon the crude oil produced by these small wells and ultimately upset the economy of the entire area.
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> A study of the Arkansas Oil (Producers) Association indicated that relief of the severance taxes on these wells would be sufficient to allow construction of injection systems in practically all cases . . . The most striking experience noted since this legislation has been a 1,869,000,000 pound per year reduction in the salt content of the Ouachita River at the Arkansas-Louisiana state line . . . The number of subsurface injection systems has increased from 56 in 1958 to 215 in mid-1963. We feel that such incentives are unquestionably of value in encouraging industrial waste treatment for control of water pollution.[88]

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[88] M. L. Wood, Director, Arkansas Water Pollution Control Commission, to Howard N. Mantel, February 10, 1964. The program, in practice, operates as follows, according to Mr. Wood: (1) application to Oil and Gas Commission to utilize a specific formation for injection; (2) application to Water Pollution Control Commission for permit to construct surface facilities (gathering system, storage tanks, treatment units, etc.); (3) construction of system after approval of Oil and Gas Commission and issuance of AWPCC Permit; (4) request to Oil and Gas Commission for Certification of system as eligible for severance tax; (5) following the Oil and Gas certification, a field inspector of the AWPCC inspects the system and if found acceptable it is certified by the AWPCC to the State Revenue Department as eligible for severance tax credits; (6) the Revenue Department then authorizes the pipeline purchaser to credit the producer with the severance taxes which would normally be withheld from his payment.

Accelerated Depreciation at the State Level

In addition to property tax exemption several states provide for accelerated depreciation. A five-year write-off period is provided under North Carolina, Virginia, and Wisconsin law.[89] North Carolina and Wisconsin as noted also have property tax exemption. James Flannery notes that in none of the three states do the respective state pollution control authorities regard the legislation as being significant in the attainment of pollution control objectives:

> A mitigating factor in this conclusion is the comparatively low rate--2 to 6 percent--of the corporate income tax in each of these states. Therefore, the impact of the amortization provision is reduced considerably.[90]

At the state level, the loss of state revenue is greater than the gain to the taxpayer because of the Federal deductibility of state taxes. In other words, a concession by the state which costs the state $100 in revenues will save the taxpayer at best only $50 (if he is a corporation subject to the 50 percent rate).

With respect to the North Carolina law, one firm, Mid-Atlantic Utility Company, did not take advantage of the rapid amortization provision: "Mid-Atlantic presently serves less than 400 connections; therefore, taxable income is a modest figure and rapid amortization has not been of great concern to us. We do feel that a tax law containing provisions for fast write-off of waste treatment systems is desirable and would tend to partially offset the expense of conforming to governmental requirements as to pollution control."[91]

In the Champion Papers situation, involving a $1.4 million pollution control facility, rapid amortization was not utilized. The company's tax manager comments: "It is impractical for us to use the rapid amortization provisions of the North Carolina Act because the Federal Internal Revenue Code does not contain a similar provision. It should be borne in mind that any provision for rapid amortization is not a tax saving but rather a tax deferral. Any advantage that might be obtained under the North Carolina law is more than offset by the additional time and effort required to maintain separate accounting for the two returns."[92] While the tax deferral point is valid, it ignores the interest value of the amount deferred. The accounting burden complained of probably would not be an obstacle in the event of the more significant advantages say under an immediate write-off provision under the Internal Revenue Code.

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[89] See, for texts of the laws, North Carolina Laws of 1955, ch. 1100, Virginia Laws of 1954, ch. 516, and Wisconsin Laws of 1953, ch. 183, ch. 648.

[90] James J. Flannery. "Rapid Tax Amortization for Industrial Waste Treatment Facilities," Sewage and Industrial Wastes, vol. 31 (March 1959), p. 282, 286.

[91] Information furnished by Alfred H. Iseley, Jr., Mid Atlantic Utility Company (Kavanagh, Smith & Company and Subsidiaries), Greensboro, North Carolina.

The Champion Papers representative makes these recommendations regarding other incentives:

> We definitely feel that Federal concession should be made; either as a provision for rapid amortization or as an allowable deduction in the year the expenditure is made. Then the states should conform their laws to Federal practice. These provisions should apply to expenditures for both stream and air pollution control facilities that are installed in the public interest and where there is no pay out or profit from their operation. Certainly a tax concession would encourage companies to make expenditures necessary for significant improvements in stream and air conditions. In the consideration of this matter by Congress, it should be made clear at the outset that legislation passed would be made retroactive for a reasonable period of years, otherwise many companies would feel justified in completely suspending expenditures for waste treatment facilities until the outcome of congressional action was known.
>
> Other incentive devices which might be developed at any level of government could include actual tax credits based on the actual operating expenses incurred by waste treatment plants --since these are generally operated on compulsion from governing bodies, with no possibility of monetary return; and low interest loans from state or Federal treasuries would be of considerable help in firming up industrial decisions to go ahead with waste facility construction plans. . .
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> We feel that our company is definitely penalized because of the requirements for us to expend large sums of money to conform to the code regulations on the streams receiving our effluents. In the last five years, we have had to expend over two million dollars for the construction of strictly waste treatment works; and operating expensesfor these treatment plants approximate $600,000 per year. Besides these expenditures, we currently have projects for completion in 1964 amounting to two million dollars for waste treatment facilities alone. Beyond this, we are expending several millions more on projects which are designed to improve our in-plant processes--far beyond the

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[92] Coombs, op. cit.

point of pure economic return.[93]

Overall, the value of incentives at the state and local level is quite limited. Many states do not have corporate income taxes. For the states that do, immediate write-off, compared to the five-year write-off programs under North Carolina, Virginia, and Wisconsin law, would provide only a small degree of relief. The impact is not likely to be substantial.

State and Local Government Loans

A further possible source of financial assistance for industrial abatement is through state and local government loans, roughly paralleling loan programs suggested for the Federal government. State and local government loan programs would not be comprehensive nor uniform and cannot be depended upon to support a national policy against water pollution, unless the Federal government itself induces state and local governments to participate by indemnifying them for losses of state or local revenues. Moreover, state constitutional restrictions on use of state or local credit for support of private corporations would limit the number of states and local governments which could undertake such a program. Since the states and local governments are already hard pressed financially, they may have stretched available credit--particularly at the local level--as far as it will go at present.

One advantage of state and local loans is the possible availability of lower interest rates due to the tax exempt feature of state and local government bonds, compared to interest rates which the Federal government can charge without subsidization of interest costs. Industrial development programs in the New England, southern and several other states make loans to business firms to attract or to hold industry; and some provide other types of financing as by stock purchase and construction of plants which are then leased under very favorable terms to the industrial firms.

New York City has experimented with a low cost loan program to assist landlords in rehabilitating rundown multiple dwellings. The program has had little success largely due to the red tape of obtaining loans, particularly where the potential borrower sees no immediate advantage to himself. (The same problem appears to be behind the lack of response by polluting firms to the Small Business Administration's loan program.)

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[93] Ibid. Alton B. Smith of Royal Cotton Mill Company expressed the view that "a Federal rapid amortization tax law would be desirable in most cases. However, I think those wishing to should be able to stretch it out longer should they desire." Smith, op. cit.

Chapter VIII

FACILITATING PUBLIC TREATMENT OF INDUSTRIAL WASTES

This chapter concentrates first on a complementary approach to the problem of abating industrial pollution which for some firms may prove to be a viable alternative. Instead of schemes to assist firms in treating their own wastes, the chapter discusses the possible merits of encouraging firms to have such wastes treated at public facilities. As noted in Chapter II, many commercial and industrial firms use public sewage and treatment facilities; the discussion here focuses on those firms which presently discharge directly into public streams or other waterways, with or without adequate treatment. In the latter part of the chapter, we discuss a corollary to proposals for treating industrial wastes at public plants. There the discussion turns to proposals for imposing charges on polluters, the proceeds from which are used to augment comprehensive public control and treatment systems.

Treating Industrial Wastes at Public Facilities

There are advantages to using public facilities, such as a municipal or special district sewage treatment system, under certain circumstances. There may be economies of scale in handling in a single public treatment facility the domestic and industrial wastes of an entire city, region, drainage basin, river valley, or other large unit. Use of municipal or other public systems may have also the advantage of relieving firms of the pressure of community criticism in the event "something" goes wrong, such as a large fish kill. Responsibility for meeting state pollution control standards would be passed to municipal or special district hands. Finally, public systems are more susceptible to regulation to assure that they are operated properly.

There are, however, limitations on the use of public treatment systems to handle industrial wastes. One may stem from the nature of the pollutants discharged. Existing municipal plants may lack the technical capacity to handle complex wastes or the type of industrial wastes involved may be incompatible with the municipal treatment processes. Smaller communities may not be able to afford facilities large enough to handle the volume of industrial wastes. (Occasionally, indeed, municipal wastes from small cities and towns are treated in the sewage facilities of large industrial plants, under contract arrangements.) Finally, distance between industrial site and public treatment plant may raise costs of waste handling to uneconomic loads.

In special circumstances, it may be necessary and desirable for the public agency and the firm to negotiate the terms and fees for treating the industrial wastes in the public facility, particularly in smaller communities involving only one or a few industrial plants.94/ The development of equitable formulas or agreements may be difficult to achieve where several firms with different types of discharges or volumes are involved, since the costs imposed on the firms should reflect both the quantity of effluent discharges and the difficulty of treatment. But it should be recognized that there is precedent for assessment of charges.

From the firm's point of view, the economic advantages of using public facilities to handle its wastes are (1) the possible lower costs because of economies of scale, (2) the lower costs at which a municipality may borrow to finance a treatment system (which in turn lowers charges paid by the firms), (3) the avoidance of large capital outlays in acquiring land and treatment facilities, and (4) the subsidization of parts of the costs of handling the firm's wastes, by the public agency itself (using general tax revenues) or by grants made to the public agency by the Federal government, and in very limited instances, by the state government (these subsidies will also lower charges paid by the firms because debt service is less).

State grants for construction of municipal sewage treatment facilities are low, involving a 1963 total appropriation by the eight states involved of $10.3 million, a jump from $4.4 million in 1956. However, Federal financial support by way of a grant program for municipal plant construction has helped tremendously in overcoming voter resistance to approving bond referenda by public agencies for financing construction of treatment plant facilities. According to the Secretary of Health, Education, and Welfare, national construction of waste treatment works (by public agencies) increased by 60 percent immediately after passage of the 1956 Federal pollution control legislation, from a level of $222 million annually to a level of $360 million; when the grant authorization was increased in 1961 the construction jumped to $545 million in 1962.95/

94/ For an excellent treatment of this subject, which details a number of additional significant legal issues, see Murray Stein. "Joint vs. Separate Treatment of Municipal and Industrial Wastes--Legal Aspects." Paper presented at the 13th Oklahoma Industrial Water Conference, March 23, 1962.

95/ 1963 Senate Hearings, op. cit., p. 442.

Naturally, Federal aid has been designed to assist municipalities in meeting the present and anticipated pollution loads. That is to say, the aid program was designed to help abate the present pollution from public sewage systems, not specifically to enable municipalities to handle wastes which industry has been discharging directly with or without adequate treatment.

Under the omnibus water pollution control bill of the 89th Congress, as passed by the Senate, municipalities would become eligible to receive a 10 percent addition on Federal aid for construction of municipal treatment plants which conform to metropolitan or regional plans. The bill also authorizes new Federal grants to encourage cities to separate their storm and sanitary sewers. A further means of stimulating use of public facilities to handle industrial loads is thus suggested, namely to increase the authorized amount of the grant program in the form of a bonus to the existing allocations. This would be used specifically to assist municipalities in handling new sources of industrial wastes or to construct sewer connections between treatment facilities and sites for future industrial development, or indeed to present industrial locations where waste effluents are discharged directly into streams.

Area Redevelopment and the War on Poverty

The economic stimulation program of the Area Redevelopment Administration together with the Accelerated Public Works Program in part provides assistance for support of industrial pollution control programs. In Providence, Rhode Island, a combined ARA loan and grant made possible construction of access roads, streets, water lines, and sewage systems for the development of a new industrial park. Three firms built plants in the industrial park stimulating jobs for nearly 1,100 people. While the emphasis was on providing job opportunities, a significant by-product of the program was a unique experiment in developing orderly industrial growth--including handling industrial waste effluents efficiently from the new or expanded plants.

ARA combines loans to industries directly, loans and grants to communities for developing public facilities for new or expanded industrial growth, technical assistance in working out an area plan for economic development, and retraining and subsistence aid. Loans for public facilities are made to states, political subdivisions of states, Indian tribes or private or public nonprofit organizations or associations representing any redevelopment area or part thereof. The loan program is similar to the direct industry loans, but the period of maturity is extended to 40 years (instead of 25 years). Loans may be made to assist in financing the purchase or development of land for public facility usage and construction, rehabilitation, alteration or expansion, or improvement of public facilities within a redevelopment area.[96]

Under ARA's grant program funds are made available to public or nonprofit bodies as under the loan program for land acquisition or development for public facility usage and the construction, rehabilitation, alteration or expansion or improvement of public facilities. Assistance must help in the successful establishment or expansion of industrial or commercial plants or facilities to provide more than a temporary alleviation of employment. Funds are limited to the difference between those which can be obtained from other sources, including ARA's loan program, and the necessary amount to insure completion of the project. The authorized amount under the program is $75 million.[97]

The Special Problems of Appalachia

A presidential commission which studied the chronic economic depression of the Appalachian area recently made a series of recommendations to create a federally chartered development corporation. This would provide capital for community development programs, such as water and sewerage, zoning, urban planning, and the control of air and stream pollution. The commission would be given authorization to issue its own taxable obligations; to buy local development bonds; to coordinate multifunctional development programs; and to provide technical assistance. Nearly one-quarter of a billion dollars would be appropriated in the first fiscal year, with magnitudes of $1.8 billion in Federal grants and $1.2 billion in Federal loans and guarantees.

Legislation to implement these recommendations has been urged by the President in his 1965 State of the Union Message.

With the continuing stress in these programs on unified community development, locational decisions should be possible which reflect maximum multifunctional use of water resources. Part of the Federal aid may be channeled into building treatment facilities--either for individual plants or for improvement of community facilities and the connections and interceptors thereto.

Thus, stimulation of pollution control measures will lead over time to a higher quality of water in the region. This should help attract new industry which feeds on natural resources, and tourists. Appalachia is marked by natural beauty and has a great recreational potential. It lies close to the urban agglomerations of the Eastern Seaboard megalopolis and to the metropolitan centers of Indianapolis, Columbus, Cleveland, and Pittsburgh. Recent studies have demonstrated a preference among urban populations for water-related recreational resources. This requires quality water suitable for boating and swimming, fishing, and related activities. By providing better quality water, these programs may help attract new or expanded industry into the area, particularly recreation.

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[96] Public Law 87-27, 75 Stat. 72 (approved May 1, 1961).

[97] Public Law 87-27, 8, 75 Stat. 53.

Regardless of the particular program, it should be remembered that any program of Federal support for the treatment of industrial wastes by public treatment systems in essence, subsidizes the firms involved (assuming, as is likely, that the assessments and charges paid by the firms do not reflect all of the costs of treatment).

Mandatory Charges and Comprehensive Pollution Control

A corollary to encouraging industries to have their wastes treated at public treatment systems is to institute a system of mandatory charges on polluting industries using the amounts recovered to develop comprehensive control systems. This gives the firms a choice: either they can prevent waste discharges, or they can contribute to a common pool which is used to finance comprehensive public treatment systems. In essence, the mandatory charges substitute for strict enforcement. At the same time the emphasis is on comprehensive pollution control methods, rather than on treatment by individual firms.

Allen V. Kneese, an economist with Resources for the Future, urges broad scale planning and development for efficient and comprehensive water use, on an areal or river-basin basis. He recommends creation of organizations with authority to deal with the dual problem of designing the system and allocating system costs in such a way as to produce efficient resource use.[98] Public policy, Kneese urges, should recognize the technical interdependence between different economic units and between all aspects of water resource development and endeavor to avoid or mitigate the distortions which operation of unregulated markets would produce:

> This could be accomplished through various combinations of central planning, construction, and operating facilities (dams, sewage treatment facilities, holding lagoons, water-supply treatment facilities, etc.) on the one hand, and a system of charges, bounties, and regulations on the other. With respect to pollution, the objective of these procedures would be to minimize the overall cost associated with disposal of wastes generated by activities in the basin (all damages and the value of all foregone opportunities plus all direct costs such as treatment, flow regulations, etc.).[99]

Through the levies or charges assessed against polluting firms, in proportion to the magnitude of their pollution and its damage downstream, firms would be induced to seek ways to reduce or treat pollution. Kneese emphasizes the economic benefits from stressing inplant process improvements including by-product recovery rather than treatment. Of course, strict enforcement of pollution control standards would accomplish the same end.

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[98] Kneese. Economic Criteria... , op. cit., pp. 4-6.

[99] Kneese. Water Pollution... op. cit., p. 30.

Kneese's suggestion poses too the difficult problem of a system of charges that reflects the actual damage done by pollution. Social costs, such as the public's deprivation of a pure stream, are extremely hard to measure in dollar terms. Moreover, inequitable situations betweem competing firms in the same industry may thus be created.

Germany has developed a unique system of regional authorities. These Genossenschaften have proven a valuable tool in controlling the pollution of the Ruhr Valley, a heavily industrialized region. They have authority to plan and construct facilities for water resources management and to assess their members with the cost of constructing and operating such facilities.

Gordon M. Fair describes the oldest of the Genossenschaften, the one for the Emscher district. Membership--which is mandatory--consists of municipal and rural administrative districts as well as industrial enterprises that discharge their waters into the Emscher or its tributaries. Both private and public enterprises have a voice in the Emscher assembly. A system of assessments is based on the principle:

> . . . that both the cost of pollution abatement and the value of direct, as well as indirect, benefits derived by a member from the execution, maintenance, and operation of specific installations of the Association are assessable. In the Emschergenossenchaft, enterprises other than mining are obligated in the roster only if their contributions equal or exceed 0.5 percent of the annual budget. If they do not, the member district in which a given enterprise is situated is assessed. Association assessment then gives way to local taxation.[100]

Assessments, like membership, are mandatory. There is an appeal mechanism to the courts to test fairness of assessments.

Those main features of the cost assessment and effluent charge system are described briefly by Allen Kneese:

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[100] Gordon M. Fair. Pollution Abatement in the Ruhr District, in Henry Jarrett (ed.), Comparisons in Resource Management (Baltimore: John Hopkins University Press, 1961), p. 152.

Very briefly put, the Emschergenossenschaft procedure is roughly as follows: (1) There is estimated first an amount of dilution water necessary to dilute a given amount of waste materials subject to sedimentation (no distinction is made between organic and inorganic material) in order that they not be destructive to fish life under the conditions of the area. An amount of dilution water required by such materials in a given effluent is then computed on that basis. (2) An analogous calculation is made for materials subject to biochemical degradation (and which therefore exert an oxygen demand) but which are not subject to sedimentation. (3) The amount of dilution required under specified conditions in order that the toxic material in the effluent not kill fish is computed by direct experimentation. (4) Certain side calculations having to do with water depletion, heat in effluent, etc., are made. The derived dilution requirements are added together for the effluent and form a basis for comparison with all other effluents. In principle, costs are distributed in accordance with the proportion of aggregate dilution requirements accounted for by the specific effluent. One might say that this procedure is based on a particular physical objective, i.e. not to "kill fish." However, the result of the method is used as an "index" of pollution even when effluents are discharged to streams in which lower or higher standards prevail than needed to preserve fish life.

The Ruhrverband method is also based on a physical objective but on a different one . . . . Again, the details are described elsewhere. In essence, however, the method is founded on the concept that toxic wastes by killing bacteria and slowing down the rate at which wastes are degraded have somewhat the same effect on treatment plant effluents and the level of BOD in streams as an increase in the amount of degradable material. On the basis of laboratory tests, an equivalence is formed so that toxic as well as degradable wastes are converted into a standard unit--a "population equivalent BOD."

These procedures can be criticized on technical as well as economic grounds. They are indeed recognized as less than ideal by the Genossenschaften but are generally defended as being readily understandable and relatively inexpensive to administer. Further development of cost assessment procedures along even more meaningful lines appears possible, however, especially in light of new technology which has recently become available or is now under development and which points to an easing of certain measurement problems.101/

101/ Allen V. Kneese. "Water Quality Management by Regional Authorities in the Ruhr Area with Special Emphasis on the Role of the Cost Assessment" (Paper before the Regional Science Association Meeting, December 27, 1962), pp. 23-24. A detailed critique of the cost assessment procedure by Kneese is presented in the Appendix.

One of the interesting features of this system is that the treatment of waste effluents in the Ruhr Valley is done comprehensively. In fact, the wastes of the area are fed into the Emscher, a relatively small stream, freeing the other rivers and streams for more beneficial purposes. In effect, the Emscher has become a major sewage conduit. It is concrete lined and shrubbery protects it from open view. A gigantic treatment plant has recently been constructed in which the entire dry weather flow of the Emscher is treated.

Because of the high concentration of industry and the resultant tremendous overload of pollutants into the Ruhr and its tributaries--affecting the Rhine River into which the Ruhr flows--drastic solutions were required. The parallels to such basins in the United States as the Delaware Valley are not as obvious as might appear.[102]

But the development of comprehensive organizations to deal with major waterways' planning and development is not strange to the United States. With the increasing participation of the Federal government--through Public Health Service, Bureau of Reclamation, and Corps of Engineers, many of the economies and other benefits which flow from dealing with the totality of water problems in a broad geographic area are being obtained. The capacity of the states and the United States to develop such regional entities as the Delaware River Basin Commission gives further proof of the capability of American government to meet the complex problems of water resources.

In dealing with private industry, however, the emphasis has been on co-operation. Mandatory charges and assessments, based in part at least on the German technique of the Genossenschaften, are certain to be widely opposed by industry and others. Nevertheless, the key to pollution abatement as we have seen is to make the polluter aware of the social costs of pollution. And this is likely to create opposition in any case. The various incentives discussed in this report are designed to assist firms meet these costs and allow them to work out their own solutions.

A New Federal Tax?

A novel proposal to reduce substantially the incidence of industrial pollution has been offered by Marion Clawson and Irving K. Fox of Resources for the Future, Inc. Their proposal involves imposing a direct tax on water use which causes pollution, but providing rebates commensurate with abatement action. Clawson and Fox outline the problem in these terms:

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[102] See Edward J. Cleary, in Jarrett, op. cit., p. 180.

> One basic difficulty is that there is little economic incentive to reduce pollution. Regulation, or the force of public opinion, can be and is brought to bear on industries and cities. But a definite financial reward has been lacking . . . . If such a tax were imposed nationally, industries would no longer have reason to seek locations where pollution was tolerated. To avoid too heavy an impact, the tax might be imposed gradually over a period of years, on a schedule decided long in advance.
>
> A Federal tax of this kind would be strongly opposed. If, however, there is a Federal or general interest sufficient to justify spending Federal funds to help municipalities with their pollution problem, is it not to their public interest in trying to reduce pollution?[103]

In addition to the manifest political problems inherent in establishing such a tax, numerous policy and technical issues are posed. Problems of setting up an equitable tax base, possible constitutional restraints, and difficulties in enforcement would also have to be resolved. Moreover, the proposed tax is no different in effect from strict and well-enforced pollution controls.

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[103] Marion Clawson and Irving K. Fox. Your Investments in Land and Water (Washington: Resources for the Future, Inc., reprint No. 27, March 1961, reprinted from American Forests, January and February 1961), p. 20.

Chapter IX

CONCLUSIONS

1. No form of assistance to private industry likely to be adopted in the foreseeable future would relieve polluters of costs of operations and maintenance of waste treatment facilities. Even if public sewage and waste treatment systems are used, only the capital facilities thereof, not operations and maintenance, are likely to receive general tax support. Land costs, which may be a significant element of total required capital investment in treatment plant facilities, do not lend themselves to preferential tax treatment because land is not depreciable. It does not appear feasible that special rules would be adopted allowing their deductability from income or making them eligible for a special investment credit. Direct cash grants offer some opportunity to subsidize a company's investment in land as well as other capital facilities. Indeed, grants could be used to cover a portion (or all) of the costs of land needed specially for pollution abatement activities, if costs of other capital investment were given special tax treatment.

2. Various forms of assistance discussed in this report would relieve firms of only a small portion of their total investment in treatment facilities. The underlying principle in providing such modest amounts of financial assistance is to help overcome possible short run economic hardship which a firm might suffer because of pollution controls imposed by government agencies. In any event there seems no justification for wholesale or long run departure from the basic economic principle that firms should bear the social costs of their pollution. Assumption by the public sector of the brunt of these costs through subsidy, or direct public assumption of responsibilities to treat industrial wastes, would simply transfer the present social costs of pollution from the public in the form of costs of making water suitable for reuse or loss of recreational facilities, to a direct and specific responsibility of the government agencies providing the subsidy or waste treatment.

3. To the extent that some financial aid is justified, it is clear that the alternative forms of assistance would have a different impact on firms in varying financial situations. Therefore, consideration should be given to the practicality and desirability of combining forms of assistance.

4. In addition, more research is needed on the social implications of pollution. Research programs should perhaps be developed to supplement existing research and enhance our capacity to devise appropriate policies. Suggested areas of investigation may include problems of common and statutory rights and responsibilities for water use;

uniformity of state laws on pollution control; Federal and state administration of water quality management programs; the political issues of pollution control and abatement; industry-government channels of communication and co-operation; and the economic implications of pollution. While considerable research on some of these topics has been done, or is underway, the whole area of inquiry seems ripe for further critical attention.

5. Finally, it is manifest that to meet successfully the future demands for water of our expanding urbanized society, acceleration of the pace of pollution control programs and enforcement is clearly in order.

APPENDIX

NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION
COMMITTEE ON STATE-AID TO INDUSTRY
RESULTS OF SURVEY -
STATE AND FEDERAL AID TO INDUSTRY FOR POLLUTION CONTROL

		Connecticut	Massachusetts
(1)	Is there a need for aid to industry in your state?	Industry able to build plants but rapid amortization would speed program.	
(2)	Have any efforts been made in your state?	Yes in 1953--a loan to industry for building pollution control facilities.	
(3)	Why did efforts fail?	Legislation failed because consensus of industry was that they could bear cost of construction.	
(4)	What form of aid would be best?	Accelerated amortization for tax purposes both state and Federal.	
(5)	What form of legislation in other states is good? Bad?	Rapid amortization good. Other financial aid might open door to other costly measures for taxpayers.	
(6)	General Comments	Favor Federal legislation over state legislation for rapid amortization because retain more money in state.	Tax relief to industry for pollution control probably unconstitutional. Pollution abatement function of town. Industry has no right to pollute.

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	New Hampshire	New York
(1) Is there a need for aid to industry in your state?		No survey made.
(2) Have any efforts been made in your state?		
(3) Why did efforts fail?		
(4) What form of aid would be best?		
(5) What form of legislation in other states is good? Bad?		
(6) General Comments	Legislature could exempt industry from regular tax assessments to finance pollution control facilities.	Informal opinion--some doubt as to legality for state aid. No tangible benefits from relinquishment of state taxes.

	Rhode Island	Vermont
(1) Is there a need for aid to industry in your state?	State aid would be of assistance but would not bring about ready adoption of waste treatment in textile industry.	No survey to determine if aid is needed.
(2) Have any efforts been made in your state?	No efforts made--only informal discussion with state tax division.	No legislation because program new and people have only general knowledge of problems involved.
(3) Why did efforts fail?		

		Rhode Island	Vermont
(4)	What form of aid would be best?	Question whether local or state aid to industry is feasible?	Wisconsin aid--and this would not be in conflict with state constitution.
(5)	What form of legislation in other states is good? Bad?		Not familiar with other laws.
(6)	General Comments	If any aid is given should be through Federal tax relief. Permit industry to decide charge-off in 1 year or up to 10 years.	Approve measures for rapid amortization but oppose direct grant from either state or Federal governments.

Committee: Commissioner Wise - Conn. (Chairman)
Commissioner Putnam - Mass.
Commissioner Allen - N. H.
Commissioner Cohn - N. Y.
Commissioner Shea - R. I.
Commissioner Plumb - Vt.

Presented at Commission Meeting at Barrington, R. I., March 23, 1954.

GPO 888-136